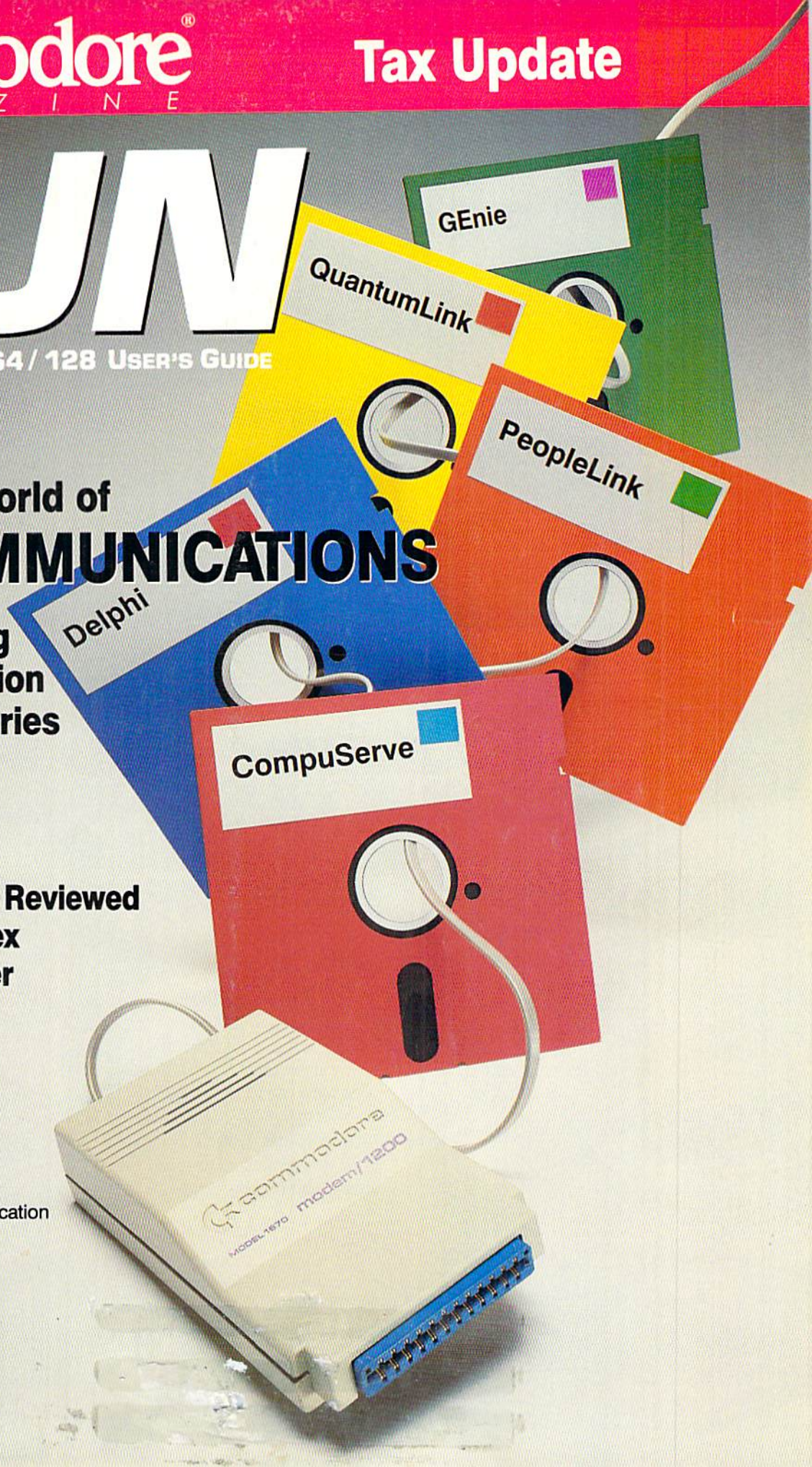
Commodore® MAGAZINE

Tax Update

RUN

THE COMMODORE 64/128 USER'S GUIDE



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February 1990
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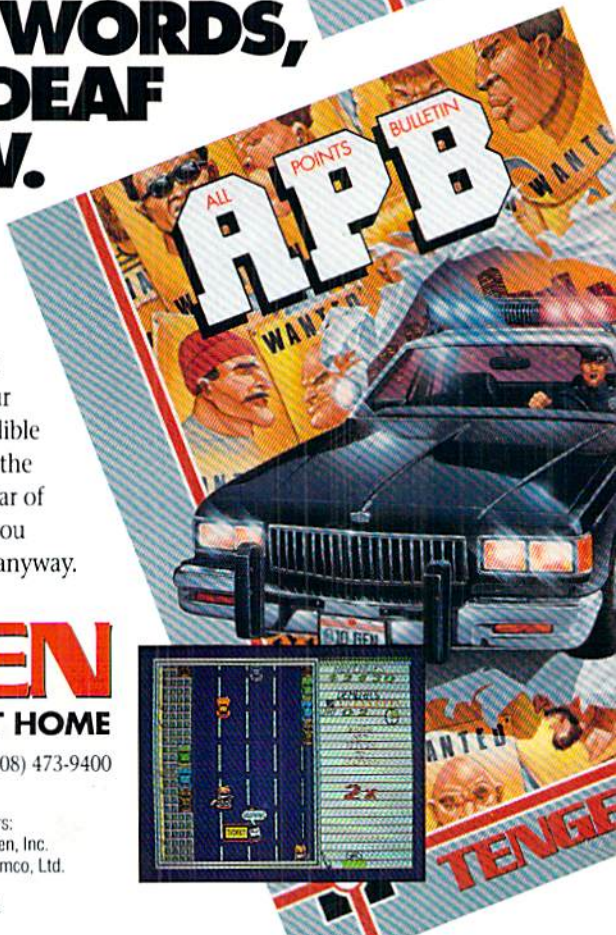

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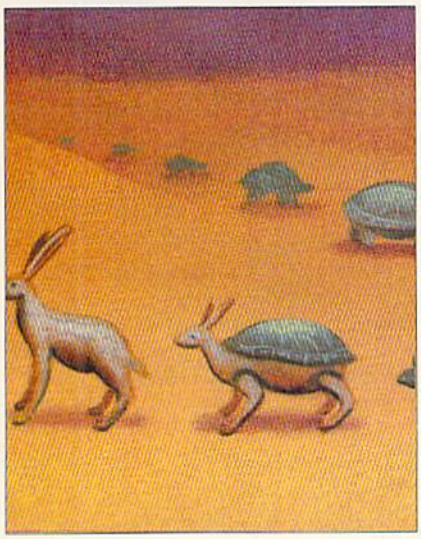

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*** The programs for these articles are on the January–February 1990 ReRUN disk, which also includes three never-published bonus programs—all for only $16.47. Order with the insert card at page 36.**

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RUNning Ruminations

Tabloid Journalism

What's more popular than Roseanne Barr, more controversial than Cher and more incredible than Elvis sightings?

It's speculation surrounding Commodore's latest "secret project." There's enough juicy gossip here to make a *National Enquirer* reporter blush.

In the spotlight is not some glamorous movie screen star or talk show host or rock 'n roll idol. No, what keeps tongues wagging is none other than the unlikely C-65, an "as yet to be announced," "still in the development process," "may never see the light of day" computer from Commodore.

Let's put to rest some of the ridiculous rumors surrounding Commodore's latest computer. ◆

While Commodore has yet to issue an official announcement, it's no secret that they are working on a new computer. Commodore's history is, in fact, chock full of computers that were never marketed.

RUN has been close to the C-65 situation since work began on the machine early last year. We've known the specs, seen the keyboard arrangement and what chips are being used. The only thing we haven't known is whether or not Commodore plans to market it. And this has precluded our joining in the rampant speculation that has plagued some of the other computer publications, which have greeted this proposed machine with mixed reviews.

What we know about the C-65 is that it is a 128K machine expandable to one megabyte of memory. It features improved speed and graphics and a built-in 3½-inch disk drive. For the most part, it will be compatible with existing C-64 software. And in keeping with Commodore tradition, its price will be attractive.

While, for the most part, we have remained silent about this machine, whose fate rests in the hands of Commodore's marketing mavens, we have been amused, and sometimes shocked, at some startling "mistruths" surrounding this new computer in other publications:

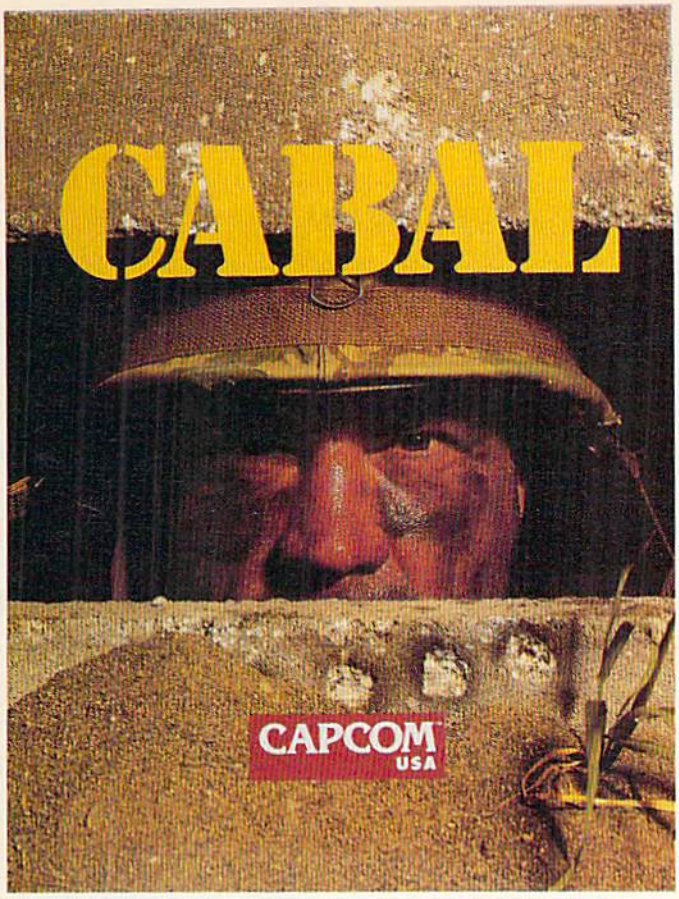
— the machine will be out in (pick one) November 1989, December 1989, November 1990, December 1990
— it will be called the 64gs
— it lacks a keyboard
— it will be the Edsel of home computers
— nobody will buy this machine
— developers won't develop software for it
— this will be Commodore's Waterloo.

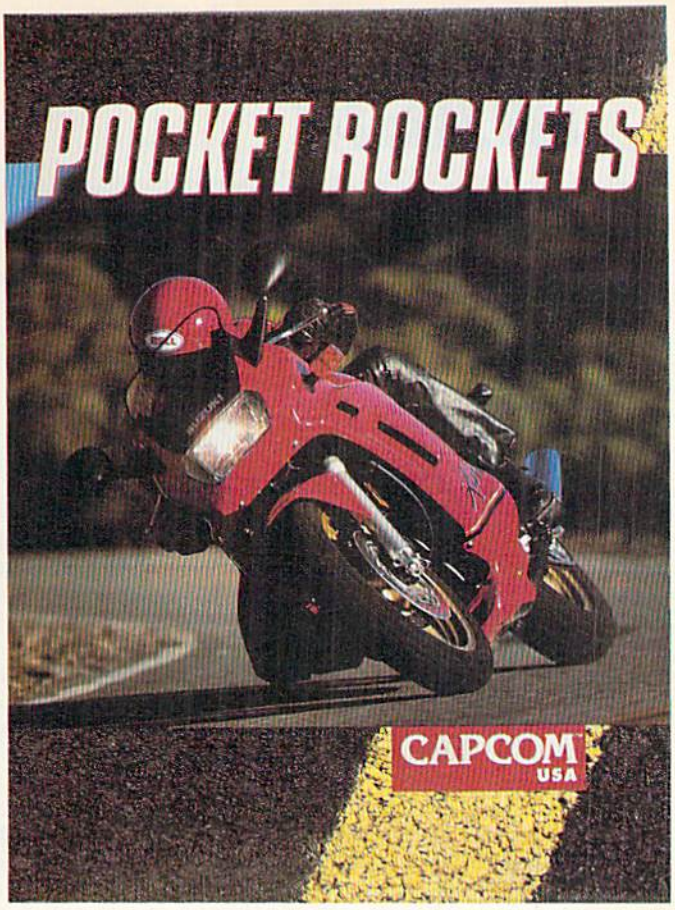
Journalists have a responsibility to report the news and maintain the readers' right to know. But they also have a responsibility to report it accurately and not to speculate wildly just for effect. . .or to sell issues. If and when Commodore decides to release the machine, *RUN* will report on it.

It's a sad commentary on the state of the industry when so much hoopla is given to a machine that is still on the drawing boards. Are we, like prepubescent rock fans, so desperate to catch a glimpse of the next potential star?

Dennis Brisson

Dennis Brisson
Editor-in-Chief





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MAGIC

Now you can put four-line addresses in Label Base, clean your drives in silence and add a dash of flash to your screen.

Compiled by TIM WALSH

$578 An Extra Line for Label Base

Many readers have expressed their fondness for Robert Kodadek's Label Base program (see the RUN Works disk or the August 1989 issue of *RUN*). However, some readers found its provision for only a one-line street address a serious limitation.

The following line changes to Label Base allow it to print two-line street addresses, or four lines per standard-sized mailing label. While adding the extra label line, I also took the liberty of adding an F8 function key Exit option to the main menu.

To incorporate these lines into Label Base, load and run *RUN*'s new Checksum in either 64 or 128 mode. Now load the Label Base program, but don't run it. Type in the necessary changes, making certain the correct checksum numbers appear. Then deactivate *RUN*'s Checksum and save the finished version of Label Base to a work disk, being sure to identify it as the four-line mailing label version.

```
Ø REM LABEL BASE WITH FOUR LINE ADDRESS -
  TIM WALSH                          :REM*154
4Ø PS=Ø:LL=2:Q=25Ø:C=4Ø:MO=64:ML=828:YR=78
   2:PRINT CHR$(142)                 :REM*129
8Ø B$=CHR$(13)+CHR$(18):O$=CHR$(146):FOR I
   =Ø TO 7:READ FD$(I),L%(I):NEXT :REM*1Ø2
12Ø DIM R$(Q,8),K(Q):FORI=1 TO Q:K(I)=I:NE
   XT                                 :REM*54
225 PRINT B$ SPC(5)"F8" O$" - QUIT LABEL B
   ASE"                               :REM*156
23Ø GOSUB31Ø:KP=ASC(A$)-132:IF KP<1 OR KP>
   8 THEN 23Ø                         :REM*86
24Ø ON KP GOSUB43Ø,56Ø,65Ø,133Ø,98Ø,88Ø,15
   9Ø,2Ø4Ø                            :REM*16
49Ø FOR I=RN TO Q:FOR N=Ø TO 7:INPUT#5,R$(
   I,N)                               :REM*237
61Ø FOR I=1 TO NR:FOR N=Ø TO 7:IF R$(K(I),
   N)="" THEN R$(K(I),N)=SP$          :REM*237
99Ø RN=T:NR=T:FLAG=1:FOR I=Ø TO 7:R$(RN,I)
   ="":NEXT                           :REM*45
1ØØØ GOSUB1Ø8Ø:FOR I=Ø TO 7:X=8+I:Y=11:GOS
     UB28Ø:POKE YR,L%(I)              :REM*111
1Ø3Ø NEXT I:K(RN)=RN:GOSUB27Ø:Y=7:GOSUB28Ø
     :PRINT"PRESS SPACE BAR FOR ANOTHER"
                                      :REM*132
1Ø9Ø X=8:Y=Ø:GOSUB28Ø:FOR I=Ø TO 7:LD=36-(
     24-L%(I))                        :REM*221
118Ø X=8:Y=Ø:GOSUB28Ø:FOR I=Ø TO 7:REM*254
128Ø FOR N=Ø TO 7:R$(K(RN),N)=R$(NR,N):R$(
     NR,N)="":NEXT                    :REM*1Ø1
143Ø GOSUB27Ø:Y=7:GOSUB28Ø            :REM*92
152Ø FOR I=Ø TO 7:R$(K(RN),I)="":NEXT
                                      :REM*95
153Ø GOSUB1Ø8Ø:FOR I=Ø TO 7:X=8+I:Y=11:GOS
     UB28Ø:POKE YR,L%(I)              :REM*123
1745 PRINT#4,R$(K(RN),3)              :REM*57
175Ø PRINT#4,R$(K(RN),4)","CHR$(32) R$(K(R
     N),5) CHR$(32);                  :REM*188
176Ø PRINT#4,R$(K(RN),6)              :REM*71
189Ø NS=NS+LEN(R$(K(I),7)):ND=79-NS
                                      :REM*192
191Ø PRINT#4,R$(K(I),7):LC=LC+1:IF LC<6Ø T
     HEN 193Ø                         :REM*58
195Ø DATA LAST,15,FIRST,18,STREET,24,STREE
     T,24                             :REM*57
2Ø4Ø PRINTCHR$(147)SPC(1Ø)"ARE YOU SURE? Y
     /N"                              :REM*196
2Ø5Ø GETA$:IF A$="" THEN 2Ø5Ø         :REM*9Ø
2Ø6Ø IF A$<>"Y" THEN RETURN           :REM*99
2Ø7Ø END                              :REM*158
```

—TIM WALSH, MAGIC COLUMNIST

$579 *RUN* Magazine Disk ID

If you'd like to add RUN to the two-character disk ID as you're formatting a 1541 disk in C-64 or C-128 mode, use the following in place of the Header command:

```
OPEN 15,8,15,"N0:diskname,"+"{SHIFT-SPACE}"+CHR$(138):
CLOSE 15
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$57A 128 Un-New

It doesn't happen often, but it does happen. You accidentally enter NEW and wipe out your favorite C-128 program before saving a copy to disk. If you have a copy of my 128 Un-New trick, your program will be restored as good as new!

Type the following in Direct mode (without a line number) then press return to revive the lost program:

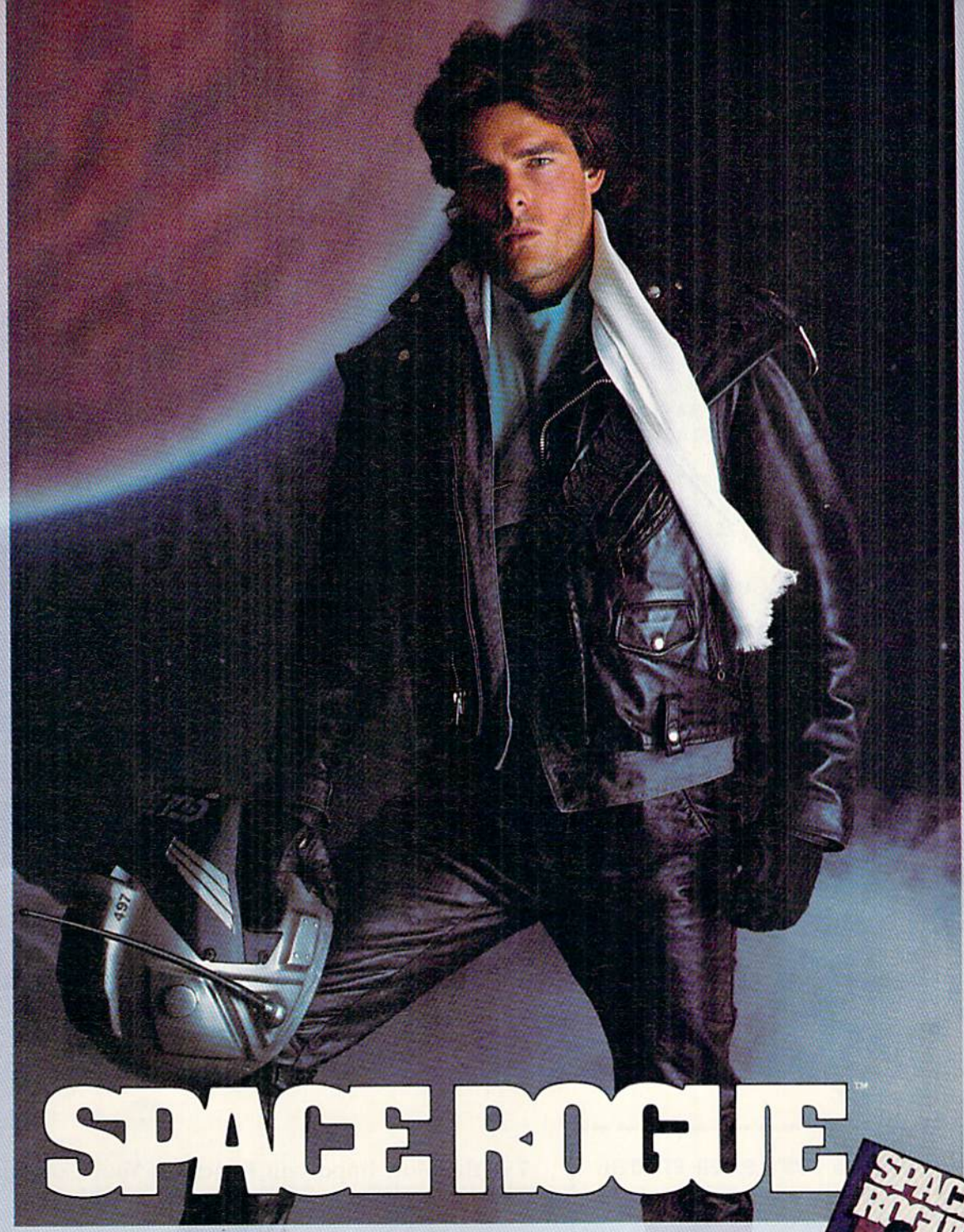
```
POKE 7170,28:X=7171:DO:Y=PEEK(X):X=X+1:LOOP
UNTIL Y=28:POKE 7169,DEC(RIGHT$(HEX$(X-2),2))
```

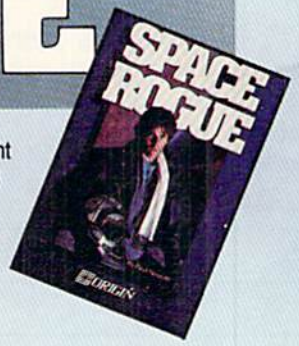
—CHRIS HAYOSH, WARREN, MI

$57B Ten C-128 Function Keys!

Most C-128 computerists know that entering the Key command allows them to redefine function keys 1 through 8. My program, Ten C-128 Function Keys, adds the help key and the shift/run-stop key combination as two more programmable function keys.

After running the program, redefine shift/run-stop by entering 9, or the help key by entering 10. Be sure to test your ►





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new key definitions by pressing either key after running the program.

```
Ø REM TEN C-128 FUNCTION KEYS - YOHANN TRE
  MBLAY                                :REM*23
1Ø SCNCLR:INPUT "ENTER FUNCTION KEY 9 OR 1
   Ø";K                                :REM*253
2Ø IF K<> 9 AND K <>1Ø THEN 1Ø         :REM*56
3Ø INPUT"ENTER NEW STRING FOR FUNCTION KEY
   ";K$                                :REM*1Ø4
4Ø FOR A = 1 TO LEN(K$):BANKØ          :REM*26
5Ø POKE 49151+A,ASC(MID$(K$,A,1)):NEXT
                                       :REM*119
6Ø POKE 25Ø,Ø:POKE 251,192:POKE 252,Ø
                                       :REM*26
7Ø BANK 15:SYS 65381,25Ø,K,LEN(K$),Ø
                                       :REM*122
```

—YOHANN TREMBLAY, CHICOUTIMI, QUE., CANADA

$57C Disk Drive-Cleaning Helper

The use of cleaning disks is essential for long-term 1541 and 1571 operation, but getting the drive to spin without head-rattling and grinding noises is no small feat. My 1541/1571 Drive Cleaner spins the drive safely and quietly, with no rattling, grinding or other sound effects. Moreover, it spins the disk long enough to ensure a thorough cleaning. Use it in either 128 or 64 mode with your favorite cleaning disk the next time you clean your drive.

```
Ø REM DISK DRIVE CLEANER - DANNY HUMMEL
                                       :REM*149
1Ø PRINTCHR$(147)"PLACE CLEANING DISK IN D
   RIVE, PRESS A KEY"                  :REM*116
2Ø GETA$:IF A$=""THEN 2Ø               :REM*212
3Ø OPEN 15,8,15                        :REM*138
4Ø OPEN 2,8,2,"#"                       :REM*99
5Ø FOR J=1 TO 35:PRINT#15,"U1:2 Ø 1 1"
                                       :REM*126
6Ø PRINT"PASS"J" OF 35"                :REM*188
7Ø PRINT#15,"U1:2 Ø 35 1"              :REM*132
8Ø NEXT J                              :REM*1Ø3
9Ø INPUT#15,A$,A$,A$,A$                 :REM*82
1ØØ CLOSE 2:CLOSE 15                   :REM*2Ø7
```

—DANNY J. HUMMEL, ESSEX, IA

$57D Quick Color 64

Have you ever wanted to change character color ROM in a fraction of a second? Changing character color in Basic is impossible, so I wrote Quick Color 64. After you've typed it in and saved it to disk, run it to see it in action.

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X ranging from 0 to 15. A demo program is incorporated into Quick Color 64 that lists the three "working" lines once the control key is pressed.

```
Ø REM QUICK COLOR 64 - JEFFREY PANICI
                                        :REM*46
1Ø PRINTCHR$(147):CK=.:S=828:FORX=STOS+23:
   READD:POKEX,D:CK=CK+D:NEXT           :REM*225
2Ø IFCK<>3953THENPRINT"ERROR!":END:REM*113
3Ø DATA 32,155,183,138,162,,157,,216,157,2
   55,216,157,254,217,157,253           :REM*1Ø9
4Ø DATA 218,232,2Ø8,241,96,96,153       :REM*3Ø
5Ø FORT=1TO1Ø:PRINTTAB(8)"PRESS CONTROL TO
    END":NEXT                           :REM*25
6Ø C(1)=1:C(2)=3:C(3)=6:C(4)=14         :REM*245
7Ø FORX=1TO4:SYS828,C(X)                :REM*21Ø
8Ø FORP=1TO4Ø:NEXTP,X:                  :REM*99
9Ø IFPEEK(653)<>4THEN 7Ø                :REM*6Ø
1ØØ PRINTCHR$(147)"{CTRL 9}USE LINES 1Ø-4Ø
    IN YOUR OWN PROGRAMS":POKE 646,1:LIST
    1Ø-4Ø                               :REM*151
```

—JEFFREY D. PANICI, SANDWICH, IL

$57E MAGIC FLASH 64

Thanks to its color graphics modes, there's almost an unlimited number of video effects that the C-64 can generate. By taking advantage of the 64's Extended Background Color mode, Magic Flash 64 causes all shifted characters to color cycle, catching the attention of anyone nearby.

Once you save the program to disk, run it. A sample screen appears that demonstrates the program in action. SYS 49152 activates the routine from within your own programs and SYS 49196 disables it. For a dramatic effect, enter SYS 49171, which fills the screen with shifted spaces.

```
Ø REM MAGIC FLASH 64 - SCOTT FICARRO
                                        :REM*171
1Ø DATA 12Ø,169,13,141,2Ø,3,169,192,141,21
   ,3,88,96,238,34,2Ø8,76,49,234        :REM*16
2Ø DATA 169,96,16Ø,Ø,153,Ø,4,153,Ø,5,153,Ø
   ,6,153,Ø,7,2ØØ,192,Ø,24Ø,3,76        :REM*196
3Ø DATA 23,192,96,12Ø,169,49,141,2Ø,3,169,
   234,141,21,3,88,96                   :REM*233
4Ø FOR I=ØTO56:READ A:POKE 49152+I,A:NEXT
                                        :REM*239
5Ø A=53265:POKE A,PEEK(A)OR64:REM EXTENDED
    BACKGROUND MODE                     :REM*195
6Ø POKE 5328Ø,Ø:POKE 53281,Ø:POKE 646,1
                                        :REM*196
7Ø SYS 49152                            :REM*244
8Ø PRINTCHR$(147)"{SHFT M}{SHFT A}{SHFT G}
   {SHFT I}{SHFT C} {SHFT F}{SHFT L}{SHFT
   A}{SHFT S}{SHFT H} BY {SHFT S}{SHFT C}{ ►
```

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```
SHFT O}{2 SHFT Ts} {SHFT F}{SHFT I}{SHF
T C}{SHFT A}{2 SHFT Rs}{SHFT O}"
                                :REM*251
```

—SCOTT FICARRO, SUSQUEHANNA, PA

$57F 80-COLUMN CURSOR MAGIC

Even long-time C-128 users might not be aware of all the special effects that the C-128's 80-column cursor is capable of producing. Register 10 of the C-128's 80-column 8563 chip controls the cursor's image. The syntax for adjusting the cursor is:

SYSDEC("CDCC"),DEC("XY"),10

The values for X are as follows:

0: Nonblinking cursor
2: Turn cursor off
4: Fast-blinking cursor
6: Slow-blinking cursor

The value of Y can vary from 0 through 7, where 0 is a large block cursor and 7 is a short underline. The following program demonstrates the differences in appearance of the cursors by adjusting both the size and the blinking rate. Use these various cursors in your next C-128 80-column program.

```
Ø REM VARIABLE SIZED 8Ø-COLUMN CURSOR - KE
  VIN SMITH                     :REM*85
1Ø SCNCLR:PRINT"PRESS ESC KEY OR SPACEBAR
   TO TOGGLE CURSOR"            :REM*95
15 PRINT"ANY OTHER KEY EXITS PROGRAM"
                                :REM*177
2Ø SYSDEC("CDCC"),DEC("Ø7"),1Ø  :REM*198
3Ø GETKEYA$                     :REM*Ø
4Ø IF A$=CHR$(27) THEN SYSDEC("CDCC"),DEC(
   "4Ø"),1Ø:GOTO 3Ø             :REM*88
5Ø IF A$=CHR$(32)THEN PRINT A$:GOTO 2Ø
                                :REM*25
6Ø END                          :REM*188
```

—KEVIN SMITH, BALTIC, CT ■

Magic is a forum in which RUN*'s imaginative and inventive readers can share with other Commodore users their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to: Magic,* RUN Magazine*, 80 Elm St., Peterborough, NH 03458.*

RUN *pays $10 to $40 for each trick published in the column. If you'd like a copy of the latest edition of* RUN*'s Magic Trick Writer's Guide, send your request with a self-addressed, stamped, business-size envelope; you'll receive a copy in two or three weeks.*

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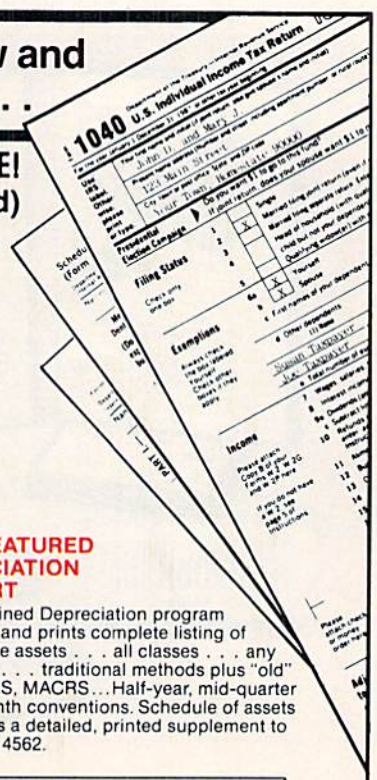

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- TaxPerfect also prints directly onto IRS forms.
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- TaxPerfect yearly updates are available at 50% discount to registered TaxPerfect users.
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News and New Products

Quake shakes west coast PCs, a new way to identify disks, and a disk drive alignment package.

Compiled by HAROLD R. BJORNSEN

Computer De-Fault Line

SAN FRANCISCO—Earthquake damage to personal computers will exceed $100 million, according to Safeware, a firm based in Columbus, Ohio, that specializes in computer insurance. The company says that computer losses already reported indicates this is "the single largest catastrophe in the history of personal computers." In one day, earthquake damage became the year's third largest source of losses, behind theft and electrical damage. Storm damage, including Hurricane Hugo, is now fourth in magnitude.

Align Your Disk Drive

ARCATA, CA—The **Disk Drive Alignment Tool** is a hardware/software device that aligns your Commodore disk drive. The kit includes an attachable LED display tool and stand-alone software package with manual. The unit requires two 9-volt batteries and a screwdriver. $69.95. North Coast Computers, 791 Eighth St., Jacoby's Storehouse, Arcata, CA 95521.

Check Reader Service number 401.

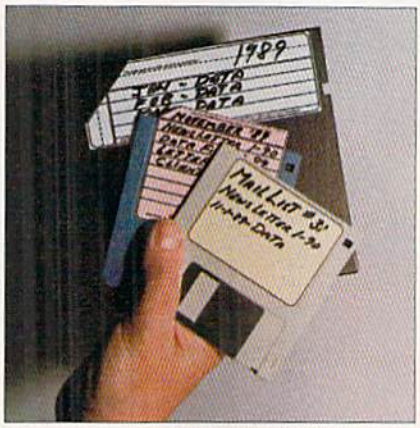
UPC Generator

CLEVELAND—Piskac Bakery Software (3376 East 65th St., Cleveland, OH 44127) has released a program that enables retailers to print out universal product codes (bar codes) on labels to affix to their merchandise. The **Universal Product Code Creator** is designed for the C-128 and the Commodore MPS1200 printer and requires 3½-by-$^{11}/_{16}$-inch labels. Price unavailable.

Check Reader Service number 403.

Erasable Disk Stickers

FREEHOLD, NJ—Weber & Sons (3468 Hwy. 9, RD #4, Freehold, NJ 07728) announces its new computer disk-identification system. The **ReMarkAble Label System** is a thin, self-adhesive plastic writing surface that you affix to the disk. Then you can handwrite information about the disk's contents on it with a special marker pen. As the contents of the disk alter, you can wipe the surface and rewrite as necessary. It's available in a kit with 100 white and 100 color-coded stickers, special marker and instructions. $39.95.



You can erase the ReMarkAble Label System stickers and write in new data.

Check Reader Service number 400.

A Tough Fight For a Princess

HUNT VALLEY, MD—**Savage** is an arcade-action/adventure game for the C-64 in which you're a powerful warrior searching for your kidnapped princess. To rescue her, you must battle your way through three game scenarios containing evil creatures, unavoidable obstacles within a tunnel-riddled dungeon, fast-scrolling screens and a magical eagle that flies through a mystical maze seeking to complete the quest. It's available for the C-64 for $29.95. Medalist International, 180 Lakefront Drive, Hunt Valley, MD 21030.

Check Reader Service number 404.

Superphone

PENSACOLA, FL—Suncoast Systems (PO Box 7105, Pensacola, FL 32514) introduces the **Computerfone**, a two-way telephone-to-computer voice digitizer and phone control unit for the C-64 and RS-232 interface. It accepts, digitizes, stores and transfers incoming speech, dials phone numbers and converts incoming tones to standard ASCII characters for processing. Other capabilities include operator notification, external switch recognition and remote contact closing. It's available for $695.

Check Reader Service number 405.

Hard Drives

EAST LONGMEADOW, MA—The **HD Series Hard Drives** are mass-storage peripherals available for the C-64 and C-128. They're compatible with most commercial software packages, include built-in GEOS and CP/M compatibility and support all Commodore DOS commands. Partitions of up to 16 megabytes are supported and can be set aside exclusively for GEOS or CP/M use. $599. Creative Micro Designs, Inc., PO Box 646, East Longmeadow, MA 01028.

Check Reader Service number 406.

Short Circuit

FARMINGTON, CT—Computer Heroes (PO Box 79, Dept. 1923, Farmington, CT 06034) has released the **Electronics AC/DC Circuit Analysis** programs for the C-64. They calculate and display general numerical solutions to electronic circuits containing up to 63 branches and 40 nodes. Special commands allow you to change parameters and recalculate solutions to a modified circuit. It's available for $29.95.

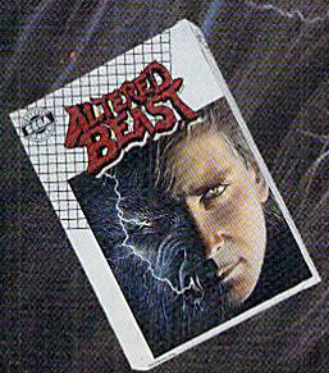
Check Reader Service number 407.

Ah-h-h-h-h-h!

RED DEER, ALBERTA, CANADA—The **Eye-Mate Optical Massage Device** is a unit worn like eyeglasses to relieve stress around the eyes after prolonged monitor use. It features a tiny, battery-operated dynamo that provides a vibrating massage for nine different areas around the eyes. $39.99, from Man Wah Corp., 57 Erickson Drive, Red Deer, Alberta, Canada T4R 1X8.

Check Reader Service number 410. ■

ALTERED BEAST



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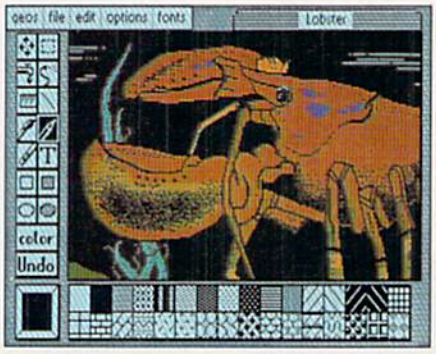

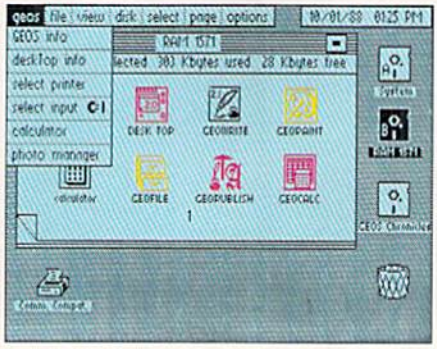

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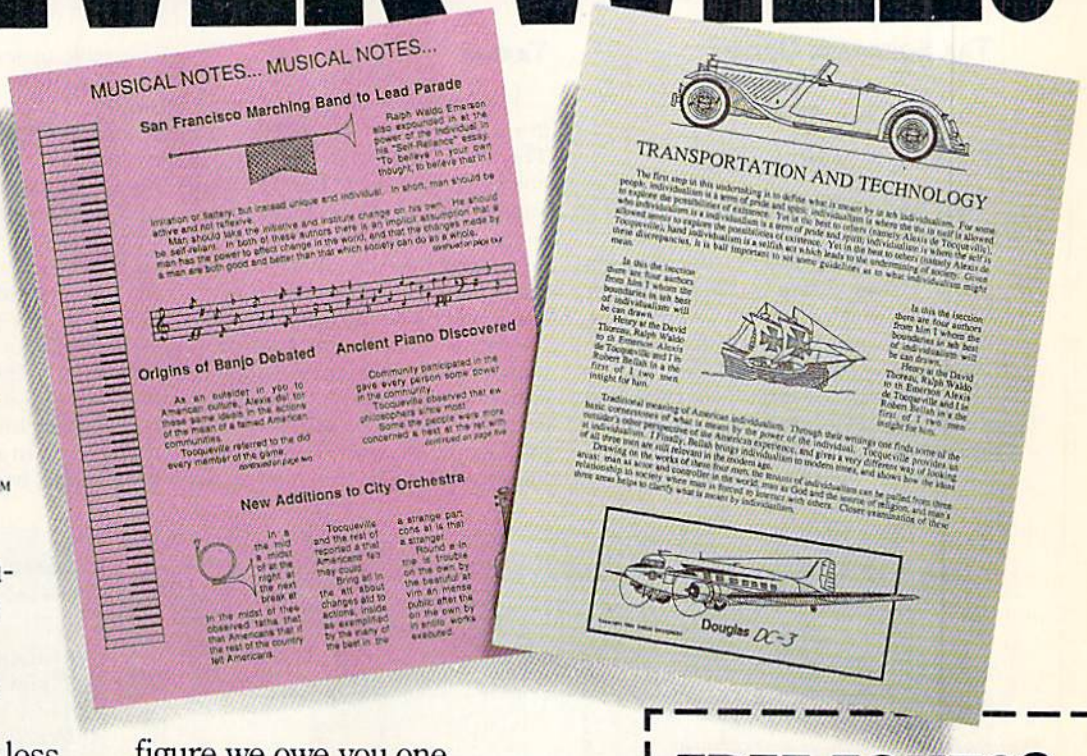
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SOFTWARE GALLERY

Turn to RUN *for tips on taxes, cybernetics, basketball, sunken treasure and more!*

By BETH S. JALA

TAX SOFTWARE UPDATE

Do You Owe More Or Receive a Refund? That is the Question

In *RUN*'s March 1989 issue, we published a review article ("Many Happy Returns") that focused on several Commodore-compatible 1988 tax programs. Now, we're publishing here a brief summary of three programs that were not previously reviewed, plus an update of the earlier article's table, reflecting the 1989 features.

TAXAID

Taxaid is a basic personal tax program for the C-64 or 128 computer. The software's main section contains Forms 1040 and 2441 and Schedules A and B. You must load separate sections to use Schedules C, D, E, and SE, and then enter the totals from each of these schedules into the main section. Taxaid wouldn't be suitable for professional tax preparers because much of the information (including name and social security number) needs to be entered for each schedule. The program is so simple to use, however, that it's excellent for a basic return. Your printout is suitable to send to the IRS for all included schedules and forms except Form 1040.

TAXPERFECT

TaxPerfect is an extensive tax preparation program. The C-64 version includes 10 forms and schedules, and the C-128 version contains 20. The latter also includes forms that aren't normally found in personal tax packages: Form 4684 (for casualties and thefts) and Form 4136 (for obtaining fuel credits). In addition, the 128 program can be loaded into RAM, which saves time in switching between sections. As an added bonus, the package contains a ►

Table 1. Features of Commodore-compatible tax programs.

	Swiftax	Tax Command	Tax Master	Taxaid	TaxPerfect 64	TaxPerfect 128	Acrotax 64	Acrotax 128
Prices:	$49.95	$59.95	$32	$49.95	$89	$99	$20	$20
Features:								
Forms 1040	x	x	x	x	x	x	x	x
1040A/EZ	x							
Schedules:								
A	x	x	x	x	x	x	x	x
B	x	x	x	x	x	x	x	x
C	x	x	x	x	x	x	x	x
D	x	x	x	x	x	x	x	x
E		x	x	x	x	x		
F	x		x			x		
R		x				x	x	x
SE	x	x		x	x	x	x	x
Forms:								
2106	x	x				x	x	x
2119		x				x		
2210						x		
2441	x	x		x	x	x	x	x
3800						x		
3903		x			x	x	x	x
4136						x		
4255						x		
4562		x	x			x		
4684						x		
6251		x			x	x		
8582							x	x
8615	x	x						
Prints on IRS Forms	x	x			x	x		
128 Mode		x		x		x		x
1990 Update	half	$29.95	discount	$18	half	half	$20	$20

Table 2. Manufacturers' names and addresses.

Swiftax
Timeworks, Inc.
444 Lake Cook Rd.
Deerfield, IL 60015

Tax Command Professional
Practical Programs, Inc.
PO Box 93104
Milwaukee, WI 53203

Tax Master
Master Software
6 Hillery Court
Randallstown, MD 21133

Taxaid
Taxaid Software, Inc.
800 Middle Rd., Box 340
La Pointe, WI 54850

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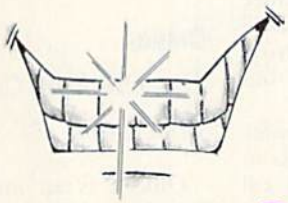

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stand-alone depreciation program that operates in 64 mode.

With its additional forms, RAM disk option and built-in calculator, this is a professional package for the C-128 owner. For the C-64 user, it's an easy-to-use personal tax program. The manual, complete for both versions, even contains the IRS business codes for Schedules C or F and full explanations of all the forms and schedules and their applications.

Acrotax

For the economy-minded user, Acrotax is quite a bargain. Both the C-64 and C-128 versions contain most of the forms and schedules needed by the average taxpayer. Everything loads in quickly from the main menu, and tax calculations are done instantaneously. For clarity, Acrotax uses different colors to highlight menu selections, commands and screen headings.

This program is easy to use and comes with a brief, six-page manual. Although there's no discount for annual updates, the total cost is less than the upgrade price for most other tax packages.

—Sandra Cook Jerome
Bloomington, MN

Shinobi ..... A

Put Your Ninja Strength, Know-How And Magic to Work

Sega has packed Shinobi's numerous game screens with enough action and variety to keep home arcaders busy for weeks. Furthermore, to give average players a reasonable chance of completing the contest, the designers have included a game-continue feature—hallelujah!

As master ninja, you must rescue the kidnapped children of the world's leaders from the clutches of the Ring of Five, an international terrorist organization. Doing so requires the successful completion of five extremely hazardous missions, each comprising a number of stages. Every mission culminates in a deadly confrontation with a member of the Ring. In the other stages, your path is obstructed by lesser foes, including gunmen, boomerang throwers and flying ninjas. Classes of villains are nicely individualized, thanks to the program's superior graphics and animation. All objects and locations are skillfully drawn and as close to arcade quality as you could want.

In Shinobi, your rescue mission requires skill, dexterity and ninja magic.

Eliminating opponents is accomplished at close quarters by kicking, punching or using your sword. You can make long-range attacks by flinging shurikens or by firing your pistol. Once during each mission, you may avail yourself of ninja magic, which destroys all henchmen in sight or weakens—but not kills—one of the Ring.

After completing a mission, you enter a bonus round, where your goal is to kill all attacking ninjas before they kill you. Instead of firing at figures approaching from left and right, you shoot at foes moving toward you from the background. Eliminating all aggressors earns you another life; losing costs you nothing.

Running, jumping, rescuing children, firing weapons and striking the enemy are easily controlled with the joystick. Ninja magic, however, is called up via the space bar, so don't forget to use this valuable feature, especially when you most need it.

Ninja magic notwithstanding, Shinobi is not an easy game. To survive, you must react speedily and appropriately to unexpected situations. Discovering your opponents' vulnerable spots and capitalizing on his weaknesses require quick thinking under pressure, as well as accurate shooting, often while airborne.

During the past year, I have reviewed many fighting games. Because of its depth of play, diverse characters, arcade-like graphics, user-friendly control system and game-continue feature, Shinobi is my favorite. *(Sega; distributed by Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062. C-64/$34.95.)*

—Len Poggiali
Syracuse, NY

Omega ..... A–

The Thinking Computerist's Tank Game

Omega is an innovative excursion into the futuristic world of cybernetics. Imagine: you've been accepted into the fold of engineers at the Organization of Strategic Intelligence. As part of its elite Omega project, it is your job to develop the deadliest cybertank in the world. You must select its chassis, weaponry, computerized systems and artificial intelligence (AI). Once it's built, you can then match your lethal tank against those developed by others—friends and enemies. This is not as much a game as it is a killer-tank construction set.

Omega is not a program to approach with just an hour or two of free time: the documentation, measuring over an inch thick, is an indication of how involved it can be. Toss away your joystick, for any moves your cybertank makes must be pre-programmed by you, who must learn Omega's pseudo-language in order to succeed. Rest assured, however, that learning the English-like syntax is extremely easy, even if you've previously programmed only your electronic coffee pot.

You're given the option of constructing a semi- or full-custom tank. The semi-custom is the easiest, as the program takes care of most of the essentials of tank building, and you simply select a chassis, weapons and electronic goodies and enter a few basic lines of AI terminology. Full-custom tanks, on the other hand, are best approached only ►

Report Card

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

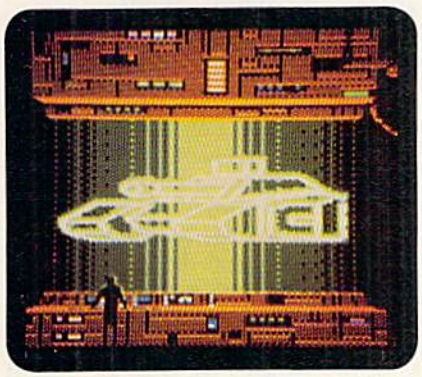
E Failure.
Many problems; should be deep-sixed!

after you're comfortable with the program, for they're painstakingly fabricated from the ground up.

The selection process is straightforward. Choices are accomplished through pull-down windows, all of which are layered in an arrangement that is highly effective.

A new player begins with 1000 points, which are used to purchase various cybertank components. If your machine is good enough, you can earn more credits by defeating other cybertanks.

Besides building your tank, you must also give it the smarts to survive. This



Your mission in Omega—should you decide to accept it—is to build a deadly cybertank.

depends on how firmly you grasp the mechanics of Omega's AI language. This language is much simpler than Basic and is extremely intuitive and logical. Programmers will immediately recognize the use of labels, indented structure, branch commands and if-then testing.

When your tank is complete, you're ready for battle. You can wage war against pre-built tanks on disk or against tanks built by you or others. There are three battle areas included on the disk, and if you tire of the scenery, you can construct new wargrounds. Competition against others is Omega's tour-de-force, for you can do battle by simply swapping data disks or by holding full-blown cybertank showdowns.

While the graphics are not exceptional, they are effective. The sound, too, is very basic, but, fortunately, Omega doesn't have to rely on sound.

My only serious complaint is that Omega is too disk-intensive. Moreover, the disk loads are slow, and the program refuses to recognize a second drive. Prepare yourself for a lot of disk flipping. I realize a game of this magnitude must be disk-intensive to fit on a 64K machine, but I would've liked a second drive or RAM expansion unit option.

Omega is sure to change the way you think of wargames and the construction set type of program. The bottom line is that Omega puts the power of creation fully in your hands. The amount of effort you put into it will directly influence the satisfaction you receive.

Believe me, the first time your full-custom tank blows the sprockets off an enemy, you'll be poring over the programming tutorials, looking for more devious tricks. *(Origin, 136-B Harvey Road, Londonderry, NH 03053. C-64/ $49.95.)*

—JOHN RYAN
BILOXI, MS

OMNI-PLAY BASKETBALL .... A–

On-Screen Sports Action Is Yours!

Have you ever dreamed of owning a sports franchise? With Omni-Play Basketball, you assume the roles of owner, coach and, to a degree, the players on a team.

As owner, you decide when to send your players to training camp, who to draft and who to trade or cut. As coach, you call the offensive and defensive signals for your team, as well as make decisions throughout a game. Older players may be more skilled, but they need to stay fresh to maintain their performance level and avoid injuries. Smart substituting keeps key players from fouling out of a game.

Portraying a player, however, isn't quite as enjoyable. Most computer sports simulations let the user totally control a player's movement. With Omni-Play, you can pass, shoot, block shots and jump for rebounds, but you can't rely on deft joystick jockeying to fake another player out of his sneakers.

Distinguishing which player you're controlling is a little difficult. It's always the player closest to the ball, but anyone who has played basketball knows how tight things get, particularly when there's a loose ball or rebound.

Otherwise, however, the graphics are excellent. The players are sharp and well-defined, and the background is realistic. Animation is smooth, with the movement of the ball and players quite lifelike.

Particularly impressive are the pregame and halftime shows, where announcers Nick and Bob are shown in a television booth. From their facial expressions to the detail on the court below, you'd swear you're watching the real thing.

These shows provide valuable statistics and strategic tips a coach can employ to defeat the opposition. A good coach will also make use of the impressive array of statistics the program tracks.

Omni-Play Basketball breaks new ground for sports simulations: It's designed so that module enhancement of the original product can change aspects like perspective or difficulty level. The first two modules released are Side-View and College League. Both require the original Omni-Play Basketball SBA League disk to be loaded first.

Loading in the Side-View module changes the original game's perspective and provides slightly more control over the players' actions. This time you see the game as though you were sitting low in the bleachers at mid-court. The graphics and color of this module lack the realism of the original view, but, on the plus side, Side-View gives the user direct control of his team's center, along with a new and interesting halftime show.

The College League module changes the strategic, rather than the visual, aspects of the original Omni-Play. Instead of professional teams, you can coach the college teams that played in the 1989 NCAA Division I Championship.

Whether you enjoy scrutinizing statistics, building a team from scratch or coaching it on the hardwood, Omni-Play Basketball should satisfy you. Although its limited player control may frustrate some, it's nevertheless an excellent program that breaks new ground with its module setup. *(SportTime, 3187-G Airway Ave., Costa Mesa, CA 92626. C-64/ $34.95; modules $19.95.)*

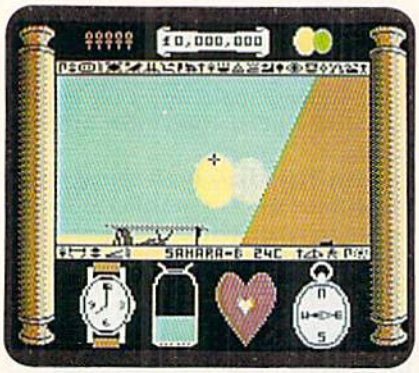
—SCOTT WASSER
WILKES-BARRE, PA

TOTAL ECLIPSE ..... B

Seek the Shrine And Evade the Eclipse

In ancient Egypt, Hahmid III, a high priest of the sun god, Ra, placed a curse on the shrine of Ra: that any object coming between the shrine and the sun would be destroyed. In two hours, a total eclipse is due over the Nile delta. Unless you can find the shrine and destroy it before the eclipse is complete, the Moon will disappear from the sky forever, and its destruction will have devastating consequences for the Earth.

This is the premise for Total Eclipse, a 3-D graphics adventure. Using the ►



Tracking time, resources, bearing and health are important in Total Eclipse.

same Freescape system of graphics modeling as Space Station Oblivion and Dark Side, the joystick or keyboard is employed to move forward and backward or turn right or left. The first-person view changes appropriately as you move. The distance you move and the angle of your turns can be adjusted to facilitate both rapid movement through open areas and precise maneuvering in tight spots. When you're in Attack mode, you can move an aiming crosshair around the screen, while your position and view remain stationary.

You begin the game with a pistol, an unlimited supply of bullets, a wristwatch, a water bottle and a compass. These last three items are displayed at the bottom of the screen to indicate the amount of time remaining before the eclipse, the amount of water you have left, and your heading. In addition, a beating heart shows your current state of health.

The shrine is in the top of a huge pyramid, but to reach it, you must find your way through a labyrinth of rooms. Many rooms are locked, and you can enter them only if you have an ankh. Ankhs can be found in various rooms in the pyramid, as can treasure chests and water troughs and pools to replenish your water supply.

Although your pistol is sometimes used to defend against dart-shooting mummies, it's more often employed to activate switches. You can open treasure chests, blocked doorways and mummy cases simply by shooting at them. It's also possible, however, to destroy essential structures by firing carelessly, so don't shoot indiscriminately at everything you see.

Total Eclipse isn't without faults. For instance, the graphics of your surroundings, while colorful, are blocky and lacking in detail, and the animation is, at times, painfully slow. However, despite these problems, interaction with the game's three-dimensional world can draw you into the story in ways even a beautifully photographed film cannot. *(Spotlight Software; distributed by Cinemaware, 4165 Thousand Oaks Blvd., Westlake Village, CA 91362. C-64/$29.95.)*

—BOB GUERRA
CHARLESTOWN, MA

SEARCH FOR THE TITANIC ..... B

Stay Dry While Exploring the Deep Seas

Prior to setting off in search of the most famous wreck in history, you must first gain the reputation of being an able "wreck hunter." Otherwise, you'll never obtain the funding necessary to get a Titanic expedition off the ground—or, in this case, over the water.

This game includes over 47 ports of call and 75 wrecks to explore. Plan to make 10 to 15 dives on different wrecks before you attempt the Titanic. Preparatory expeditions include renting or purchasing a boat, hiring a crew, buying supplies and selecting a port of call.

Financing your first few expeditions can be a nightmare in futility, because you must depend on agency grants. As you become proficient at diving on wrecks, however, acquiring money for bolder undertakings becomes easier. With monetary resources, you can hire a crew and purchase more powerful equipment and the supplies necessary for a round trip.

Once you arrive in the general location of a wreck, you have to rely on specialized high-tech equipment like weather radar, sonar, suction tubes, magnetometers, bathyspheres and minisubs to do most of the dirty work for you. Of course, if you can't yet afford such equipment, divers will either make or break your efforts to become a famous wreck hunter.

Navigating is accomplished by matching up a set of X and Y coordinates to those of the predetermined wreck sites in the documentation. Once you're close to a wreck site, you enter Exploration mode and begin the tedious task of searching for the sunken vessel.

There are various graphics screens used to work a wreck sight: diving, sonar, camera platform and piloting screens. As you slowly map out the ocean floor, you may eventually happen upon the wreck and, depending on how much effort you want to expend, even come across valuable artifacts. Discovering wrecks and artifacts increases your reputation points. Once you've amassed enough of these points, you can attempt a dive on the Titanic.

Careful planning of your expeditions is a top priority in Search for the Titanic.

Search for the Titanic is by no means a graphics extravaganza or white-knuckled adventure—but it wasn't meant to be. Strategy, planning and luck all play a part, and the graphics do a nice job of conveying critical information in an easy-to-grasp manner. Moreover, a graphics disk included with the program contains digitized pictures of the actual Titanic site. (Since the program occupies two disks, plan to do a lot of swapping.) The manual is thoughtfully laid out and well written.

In any case, Search for the Titanic does a good job of conveying a feel for the frustrations and excitement of underwater exploration. The program stresses the need for careful planning and resource conservation. Believe me, searching miles of empty ocean can be exasperating and even boring, but once you find your first sunken galleon, I'll bet that you'll be sailing back to port with another expedition in mind! *(Intracorp, Inc., 14160 SW 139th Court, Miami, FL 33186. C-64/$29.95.)*

—JOHN RYAN
BILOXI, MS

STORM ACROSS EUROPE ..... A

At last, the war game I've been hoping for—one with snappy and effective graphics and a simple interface that doesn't have me digging through the manual every few turns.

SAE is a full-scale, joystick-controlled, WW II battle simulation that follows the conflict in Europe from 1939 to 1945. It lets you re-create the entire war on colorful, detailed maps. It plays extremely fast compared to other war games, and many of the historical scenarios can be completed in a single sitting. ►

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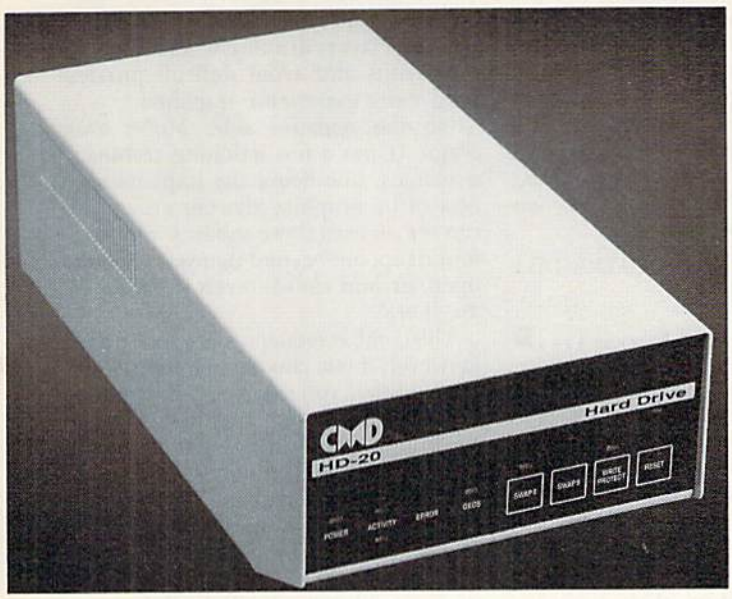

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A combination of three human or computer-controlled players is supported as Allied, Axis or Russian forces. Key aspects can be randomized so that no two games will ever be alike.

The hierarchy of available menus is extensive and comprehensive. You can access options to transfer industrial points to an allied nation, effect staff changes, create and remove armies, check on the demographics, and so on.

SAE's documentation is weighty, but its logical and ordered layout lets you begin play immediately.

Intermediate and advanced war gamers will certainly find SAE refreshing and may loath reverting to the old style of play after booting up this gem. Beginning war gamers will still have to put up with the required learning curve, but I think that with a little time and effort, they'll find SAE the very best this genre has to offer. *(Strategic Simulations, Inc.; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95.)*

—JOHN RYAN

BAD DUDES ..... B+

This program should really be called "Bad Dude," since there is no two-player option. In an effort to retain quality graphics and animation, the designers chose to forgo the Cooperative mode. That drawback aside, this street-fighting contest is better than Double Dragon, a game with which it's often compared.

You're pitted against an odd assortment of thugs, including ninjas, the fire-breathing Karnov, a padded attacker sporting deadly spikes, a killer who can duplicate himself in the heat of battle, and a host of others. Their boss, the Dragon Ninja, is holding the President captive in his hideout. Your mission entails kicking, punching and stabbing your way to save the President and defeat the crime lord once and for all.

You begin with five lives, and since your character must be hit 13 times in order to lose one life, you can stay alive for quite some time. However, time is another enemy. You're allowed four minutes to complete a screen. If you don't, the game is over, regardless of how many lives you have left.

Controlling your character is an easy matter. Simple joystick commands make him walk, crouch and jump to the upper or lower levels.

My major complaint with Bad Dudes has to do with the written description on the back of the packaging, which is woefully inaccurate, and with the documentation, which is only slightly better. Despite what you read, there are no vicious dogs on the prowl and no numchucks to increase your firepower.

Nevertheless, Bad Dudes is more fun than most games of this sort. Rescuing a real President may be a pipe dream, but a computer "Bad Dude" has a good chance of coming home a hero. *(Data East USA, Inc., 470 Needles Drive, San Jose, CA 95112. C-64/$29.95.)*

—LEN POGGIALI

SKATE CRAZY ..... B

Stunts and speed can win you the coveted championship in this roller-skating competition. Swaying the judges in your favor rests on your ability to jump over obstacles, land safely, perform turns and skate backward.

During most of the game, your view is of the "rink," a parking lot complete with gates (to pass through), tin cans (to knock down), odd junk (to leap over), and so on. There are also potholes, oil, glass and sand to avoid.

Skate Crazy's graphics offer a lively display of various scenes, with frills ranging from gangs to giant rats, and you can change between games (Car Park Challenge and Championship Course) without losing the level you had previously achieved.

Performing as a daredevil and gliding about on a pair of slick skates is fun and different from my usual run of software activities. Unfortunately, in parts of the game where I have to waggle my joystick back and forth to increase speed, my direction tends to alter. Still, I got the hang of things after a while.

Playing this game lets me experience a new form of software motion staged in a familiar arcade setting. *(Virgin Mastertronic, 18001 Cowan St., Irvine, CA 92714. C-64/$9.99.)*

—JOHN DIPRETE

MIGHT AND MAGIC II ..... C+

A sequel to a popular game is always a risky proposition. It must not only live up to the standards of the original, but also include some improvements.

The results of the Might and Magic sequel are mixed. On the plus side, a handy new feature is auto mapping, which draws a map of, and lets you access, every area you visit.

Also new is the ability to include non-player hirelings, who can join your party and increase its strength. Two new classes of warriors—barbarians and ninjas—have also been added.

This game boasts 60 different map areas, over 90 spells and more than 200 objects. Players are free to follow their own paths and avoid difficult puzzles until more experience is gained.

On the negative side, Might and Magic II has a few irritating technical problems, one being the implementation of its graphics viewing area. You can see an area three squares wide and four deep, but beyond that you see only open air and clouds, even if buildings are there!

The combat sequences are well done. However, if you choose an option other than fighting, you're faced with multiple-choice menus asking what you want to use from your inventory—but there's no list! If you don't remember what you have, you must retreat and take a look.

Also, there are many times when you're investigating an area and have no clue that an object exists on a certain square until you actually land there.

Aside from these problems, if you're a dyed-in-the-wool RPG fan, Might and Magic II will give you hours of computing fun. *(New World Computing; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95.)*

—ART LEWIS KIMBALL

INDIANA JONES AND THE LAST CRUSADE ..... E

The C-64 version of Indiana Jones and the Last Crusade is an interesting example of a climb-and-run arcade game. Unfortunately, however, it suffers from a number of shortcomings.

For instance, the sound is generally lackluster, and much more of the screen could have been used to display the program's action. Also, largely due to its relatively slow pace, the game just doesn't succeed in re-creating the movie's excitement.

In addition, there is a more serious defect in the program: it causes the disk drive motor to run without stopping throughout a game. [*Editor's note: A spokesperson from Lucasfilm confirmed that the drive motor on their C-64 system also continued running after the program had loaded, and they have no version that shuts the motor off.*] Since this constant activity could burn out the motor, extended play of Indiana Jones and the Last Crusade is definitely not recommended. *(Lucasfilm; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—WALT LATOCHA ■

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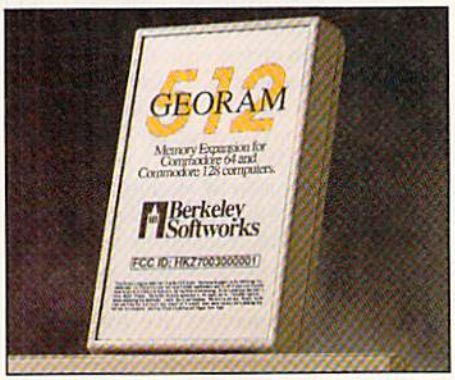

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METHINKS THOU DOST PROTEST ENOUGH!

I'm writing in reaction to the general tone of the more current issues of *RUN*. I note a slight anger toward software companies for their general abandonment of Commodore 8-bit machines in anything other than game software.

Videomax Industries (PO Box 905, Eugene, OR 97440) has been developing productivity software for the C-64 and C-128 for many years. At one point we also abandoned 64/128 support, but the volume of protest mail we received convinced us to resume software support.

—JOHNMICHAEL MONTEITH
PRESIDENT
VIDEOMAX INDUSTRIES

TECHNOLOGY AT HAND

Every once in a while a breeze comes along and breathes new life into a stagnating world. Editor-in-Chief Dennis Brisson's editorial (RUNning Ruminations, October 1989) was one of those zephyrs.

Software development, other than games, has stagnated to three subjects: word processors, spreadsheets and databases. There is still a virtually untapped area in computer interfacing, which lets the computer control and monitor the household in many ways. Graphics is still wide open when it comes to animation. Speech synthesis and recognition has been dropped.

The technology is at hand; the time is right. The rest is up to what the mind can conceive. Don't forget, many of the greatest inventions came right out of home workshops.

—JAMES W. PATE
OAKLAND, CA

UPDATING 64/128 USERS

I, too, agree with reader John D. Miller (Mail RUN, "In Commodore We Trust?", October 1989) that Commodore is determined to have all 64 and 128 users update to Amiga computers. They may drive the once faithful into the welcoming arms of their competitors! Having accumulated a substantial program library, I cannot conceive of junking them for a different computer system. I even bought a C-128D for backup in case some catastrophe wipes out my C-128.

—GEORGE J. CLARK
POINTE CLAIRE, QUE., CANADA

UNUSUAL APPLICATIONS REDUX

In response to your call for unusual applications ("Sculptor, Lawyer, Editor-in-Chief," *RUN*, August 1989), I use my C-64 every day in my work as a freelance technical translator of German to English. German documents arrive by mail or by modem to my MCI Mailbox, and I send them back in English. I type the English version on screen as I'm reading the German document. I proofread short documents directly. For longer documents, I run it through an 85,000-word spelling checker.

If delivery is to be via modem, I type my invoice directly at the bottom of the document and transmit it to the customer's MCI Mailbox with a Commodore 1670 modem at 1200 baud. Any necessary hardcopies are printed out on a Commodore DPS-1101 daisywheel printer.

In the meantime, my two part-time typists have Leading Edge and Apple IIGS computers. I'm sorry, but I can't help them figure out how to run Word Perfect or anything else. They will have to buy 500-page books on the subject or take courses. I'm too busy earning money wth my C-64 to delve into the mysteries of their machines.

—CHESTER E. CLAFF
BROCKTON, MA

Five years ago, the local newspaper decided to upgrade from typewriters. Their computer of choice was the C-64—five of them. Today, the text of the Oxford (Alabama) *Sun* (circulation 33,000) is composed entirely with the 64 and, believe it or not, one of the first word processors to hit the market, Easy Script. When asked why the paper hadn't upgraded to a more modern processor, publisher John Childs simply said, "It hasn't been necessary."

—NORMAN MORRISON
OXFORD, AL

THE NATURE OF THE BEAST

I think the game reviews in Software Gallery are great; they help me to make the right choices. However, by the time the review comes out, the game has been in the stores a few months. Why can't a review get published in or right after the month that the game hits the retail stores?

—CHRIS MADISON
GLENDALE, NY

Unfortunately, not only must we work three to four months ahead of publication dates, but it takes time for software developers to send us their programs, which must then be forwarded to our reviewers, who in turn need a few weeks to get copy back to us. Such is the nature of the publishing beast.

—EDITORS

LABEL BASE ENHANCEMENTS

In the August 1989 *RUN*, Label Base works fine but I'd like to add another line to the address label. How might I do this?

—GARY E. WIGLEY
FORT WORTH, TX

For a routine that does this and more, see the Magic trick on page 6 of this issue.

—EDITORS ■

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

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Online, In Touch, Out of Sight

Tune in and turn on to telecomputing to bring people, events and numerous services into your home.

Writers, probably more often than other people, keep an eye on their mailbox. These receptacles are our houses of worship, altars that receive our never-ending correspondence and, occasionally, even a paycheck or two. Of course, Sundays, holidays and geographical distance have always hampered the U.S. mail service, but now you can communicate across the country by computer in a matter of seconds, no matter what day it is.

Moreover, while paychecks are still occasional, I can do all my banking and a goodly amount of shopping, follow investments, access immense research facilities, chat with people from all over the world, and even arrange a vacation from the comfort of my home. That's the wonderful world of telecommunications!

Now, before you start muttering about stop-bits, protocols and handshaking, rest assured that a small investment and a bit of insight—which this article intends to provide—can get you online with little fuss. Your first two or three forays may be confusing, but with a little preparation and a clear idea of what you want to accomplish, telecommunicating will become second nature.

Nuts and Bolts

After entertainment and productivity, telecommunicating is the third most popular application among Commodore owners, and studies have shown that modems rank just behind printers as the most coveted computer peripheral. A modem is your link to the online world, a bridge between your telephone and the user port at the back of the computer. It's called a modem because it MOdulates the binary information emitted by your computer into analog signals that can be sent over ordinary telephone lines. Conversely, it DEModulates analog signals into binary bit streams that are understandable to a computer. A modem is not the magic box many make it out to be; it's more of a translator than anything else.

Modems are categorized by the "baud" rate at which they send and receive data. Rates of 300, 1200 and 2400 baud are the most common. The higher the rate, the faster you can download (receive) or upload (send) a file, which often means savings when you're calling long-distance or crawling around a commercial bulletin board.

The most popular Commodore modem is the 1200-baud 1670, which you can purchase from mail-order houses for between $60 and $75. The older Commodore 1660 is a 300-baud modem that's been selling for less than $30 through many retail and mail-order houses. While the 1660 appears to be a real value for getting online quickly, I suggest you buy the 1670 instead, for, as you'll see later, the time it saves on the commercial boards will quickly pay the difference (usually within the first month of use!).

For the more adventurous, Supra Corporation (1133 Commercial Way, Albany, OR 97321) manufactures a Commodore-specific 2400-baud modem ($219 retail) that will ►

By JOHN RYAN

ILLUSTRATED BY TROY THOMAS

turbo-charge your online time. Although commercial boards usually charge more for 2400-baud access, you'll still realize savings, especially when calling long-distance. Other third-party Commodore-compatible modems are available, as well. Inquire at your local computer store or user group.

The 1670 offers many of the features that make telecommunicating easier, including autodial and autoanswer, rotary and pulse dialing, and an audible speaker. Any modem you purchase, regardless of make or model, should offer these now-standard features.

Of Terminals and Protocols

For all their power, modems are stupid animals on their own; they need a terminal program to tell them what to do. The meaning of "terminal" here is a holdover from the early days of computing, when users typed away on "dumb" terminals connected to mainframes via serial cables or telephone lines. These terminals had no CPUs of their own; they relied on the host mainframe for computing power. Today, a terminal program effectively turns your Commodore into such a terminal, slaving it to the computer you're calling.

With any good terminal program, you can store a series of telephone numbers in its directory and have them automatically dialed. Most also offer automatic redialing and a capture buffer, usually a 16K–64K area in computer memory reserved to store text as it appears on-screen. This is handy, especially for calling long-distance boards. With a buffer you can capture a whole series of messages, save them to disk, then log off and read them at your leisure with just about any word processor.

Before you send or receive text in your terminal mode, you must decide on the protocol to use. "Protocol" here refers to the type of transmission error-checking a terminal uses to ensure that each block of data sent or received is error free. There are almost as many protocols as there are commercial information services, with Punter and Xmodem being the most common in use with Commodores. CompuServe has its own proprietary protocol called CompuServe B, which is supported by many popular terminal programs. Recently, protocols such as Ymodem, Zmodem, Wxmodem and Kermit have also increased in usage and familiarity.

Don't worry too much about protocols in the beginning. Commercial boards and BBSs usually tell which ones they recognize. While Xmodem is normally the slowest protocol, it's also one of the most reliable. You may want to stick with it until you get your online legs under you.

Getting Aboard

Before you rush off and purchase a modem and terminal program, ask yourself *why* you want to get online. There are many possible reasons, one of the most popular being the online availability of thousands of public domain (PD) programs. Most computer bulletin boards and commercial information services offer huge libraries containing everything from educational programs to games to utilities. These PD programs can be had for the price of a telephone call (free if local) and for the few cents a minute it may cost to access a commercial service.

Some programs available online are commercial-quality "shareware," where a small voluntary fee (usually $5–$10) registers you for updates, newsletters or more powerful future versions. Most of the heavy-duty PD utility, terminal and productivity software I have are shareware, and they are well worth the donation.

People also purchase modems so they can "chat" with others, whether across town or across the nation. All computers speak basically the same language—the American Standard Code for Information Interchange, or ASCII—so Commodores can talk to Apples, IBMs or even Cyber 180 mainframes. As a result, you and a friend can chat by simply dialing the phone and letting your terminals connect, regardless of your hardware or software. (See Table 1.) In fact, many terminals offer a "Chat mode," which splits the monitor screen into two sections, one for incoming text, the other (usually the bottom two or three lines) where you can type messages without having them scrambled by what's coming in.

Computer bulletin boards are another popular pastime for onliners. Almost every town has at least one BBS, usually run by a local user's group or dedicated hobbyist. (See Table 2.) BBSs are not simply message bases. Most offer specialized conference areas, software libraries, limited electronic mail (E-mail) capability, and even online games.

Moreover, BBSs are cheap sources of PD programs, many of which are uploaded to them by the BBS's system operator (SYSOP) or members. (See Table 3.) New BBS members are normally limited to 30–60 minutes online, but most boards grant additional time whenever you upload a new file to them. Where do you get these new files? From other BBSs or commercial services, of course. (You can access *RUN*'s own BBS, the RUNning Board, by calling 603-924-9704.)

The Mega Boards

Commercial BBSs are often referred to as information services or networks, and you may already be familiar with some, such as CompuServe, GEnie and QuantumLink, simply from reading magazine advertisements. These services (see Table 4) are vast clearing houses for information, offering everything from chatting and news to online shopping and huge software libraries. In return, you may pay a flat monthly fee and/or an hourly online charge, plus maybe a surcharge for special features such as stock market quotes and news retrieval.

Most of the services can be accessed with an ordinary terminal program, and, unless you live in a rural area, you

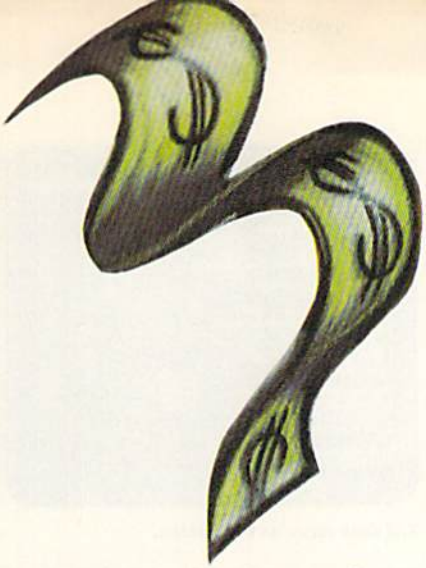
Table 1. Chatting shorthand.

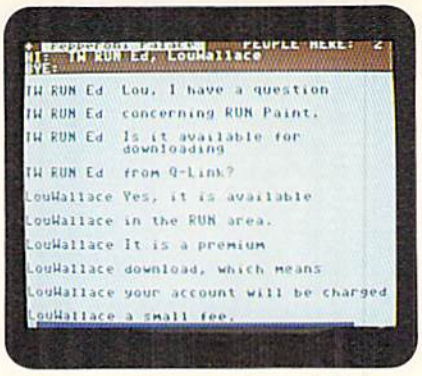
ACCESSING A CHAT LINE for the first time can be an exercise in confusion. Not only will most people seem to type faster than you, but they'll seem to enter a lot of gibberish as well! Sentences such as "LOL ;)" will run rampant across your screen, and you'll be into next month's paycheck trying to figure out what it all means.

Well, not to worry. The gibberish is simply codes that chatters have invented to express common ideas that would otherwise take several words or sentences. Below is a short list of the symbols you'll see most often. Notice the resemblance between the last ten symbols, when viewed sideways, to various facial expressions.

AFK Away from keyboard. (Someone's at the door.)
BRB Be right back. (Hold on while I put the kids to bed!)
TTFN Ta-ta for now. (See you later.)
LOL Laugh out loud! (Funny.)
HIYA Hello there!
BAK Back at keyboard.
;) Wink and a smile.
:) Happy face.
:(Sad face.
:p Tongue sticking out.
:* Here's a kiss.
:/ Perplexed/chagrined.
:o Surprised.
:' Tongue in cheek.
:+ Feeling sick.
>:< Frowning/angry.

CompuServe's wide panorama of choices.





RUN editors answer questions on Q-Link.

can probably save money by calling them through a local "node," such as Tymnet, Telenet or Redi-Access. These nodes use packet-switching technology to connect you to long-distance numbers as if they were local. (Packet switching transmits only data, not voice.) Some nodes assess you a $3-per-hour surcharge during non-prime-time hours (usually 6 PM to 8 AM)—and double that in prime time—in addition to the rates charged by the information service you connect to. The major services usually supply a list of local access numbers and their surcharges.

The First and Biggest

The CompuServe information service is the largest in the country, and has the most varied and comprehensive offerings. It is undoubtedly the news king, whether for national, sporting, business, weather or aviation news. You may even specify what subjects you're interested in and have the news waiting for you when you log on.

Although CompuServe's Commodore libraries are not the largest around, there are enough files there to keep you busy for months. (To access them, type GO CBM after logging on.) CompuServe was the pioneer of online interactive games, and its Megawars series, where players battle away in the farthest reaches of space, are just as popular as ever. As do many services, CompuServe offers a wide variety of electronic shops where you can purchase everything from computer software to stereos.

Because CompuServe is the largest service, it can be expensive as well, something a novice telegamer may want to keep in mind. It's easy to get carried away by the novelty of going online, and it doesn't take long to run up a $100 charge when using CompuServe's premium services.

The Commodore Connection

As the only Commodore-specific service available, QuantumLink took a novel approach to telecommunications right from the start. While you negotiate your way around most boards through a series of numbered menus, Q-Link provides a graphics-oriented interface specific to Commodore computers. Because of this, you need the special terminal program supplied by Q-Link.

Among the dozens of services offered by Q-Link is the new Club Caribe environment (see *RUN*, November 1989), by far the most ambitious approach to online chatting in existence. Club members represent themselves with animated characters that they move around a simulated world. Traditional chatting is also available, however, through the People Connection, the most popular area on Q-Link.

Another unique service offered by Q-Link takes advantage of the Commodore's sound capabilities. Known as the Music ►

Table 2. Some user's groups' BBS numbers.

HERE IS A LIST of *access* numbers to some BBSs run by Commodore user's groups. We're sure that many more exist. Look for some in your area.

ALASKA
Anchorage Commodore User's Group: 907-349-7467

ARKANSAS
Commodore Computer Club of Fort Smith: 501-646-3399

CALIFORNIA
Fresno Commodore User's Group/64UM: 209-226-5313
Central Coast Commodore User's Group: 805-934-2216

FLORIDA
Central Florida Commodore User's Club: 407-291-8730

ILLINOIS
Board User's Syndicate: 312-331-4548
Fox Valley Pet User's Group: 312-888-1112

MASSACHUSETTS
Boston Computer Society: 617-227-9246

MICHIGAN
Kalamazoo Valley Communicators: 616-345-6362

NEBRASKA
Greater Omaha Commodore User's Group: 402-292-3628

NEW YORK
Commodore User's Group of Rochester: 716-621-5908

PENNSYLVANIA
Lower Bucks User's Group: 215-547-7009

SOUTH DAKOTA
Aberdeen Commodore Computer Club: 605-622-3880

TENNESSEE
Memphis Commodore User's Club: 901-362-0632

TEXAS
Tri-State Commodore User's Group: 806-355-3031

VIRGINIA
Peninsula Commodore User's Group: 804-886-0901
RACE +: 703-344-0857

WASHINGTON
Blue Mountain Commodore User's Group: 509-529-5226

GEnie can fulfill many of your wishes.

The Club menu on PeopleLink.

Part of a conversation on Delphi.

Connection, it lets you actually play thousands of music files while you're online.

Elsewhere on Q-Link, you'll find a huge software library of over 15,000 titles, news and entertainment features, Stocklink and travel services. There's even a *RUN* magazine area, where you can download programs from previous issues and leave messages for the *RUN* editors.

I Dream of GEnie

GEnie, the General Electric Information Service, has grown from an upstart challenger to CompuServe into a PD powerhouse. Its Commodore roundtable has the largest Commodore PD library of any online service; the offerings are simply staggering! If you can't find the program you're looking for here, you probably won't find it at all. Also, like CompuServe, GEnie offers one of the best E-mail facilities around; it's my favorite for sending letters or programs.

The service also offers comprehensive news gathering and retrieval, including Dow Jones News Retrieval and VESTOR, an electronic stock brokerage service that lets you track portfolios and buy or sell stocks and stock options. These financial services cost extra.

GEnie offers dozens of other interesting services, the most noteworthy of which are its special-interest roundtables and interactive flight simulator (complete with animated graphics!). Whether you're a writer, scuba diver or would-be ace, you'll probably find people with much the same passions around the GEnie lamp!

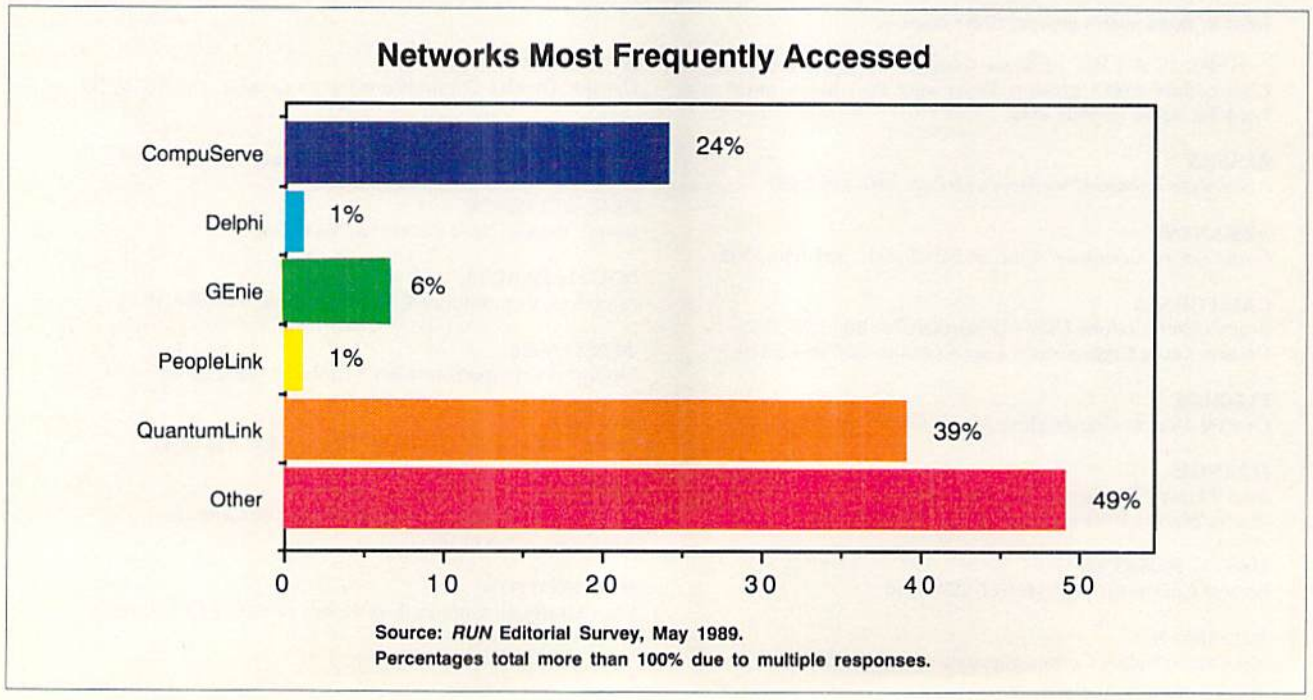
Plinking on the Keys

American PeopleLink (the choice of Plinkers, as they affectionately call themselves) is similar to GEnie in many ways, including its menu structure. While PeopleLink's Commodore 8-bit libraries are not quite as active as GEnie's, it is the preferred board for the Amiga community (and some of this is beginning to rub off on 8-bitters!). PeopleLink offers many online games and entertainment features. It also sports a very active message base and chat service, and tends to be more adult-oriented than other services (and when I say "adult," I mean "adult"). If you're a lonely heart or just looking to socialize, then PeopleLink is the place to meet.

The Oracle

The Delphi information service is a researcher's dream. Through its Lockheed Dialog Information Service, you can gain instant access to over 250 databases covering many areas. Medical, scientific, professional and news information is all there for the downloading, in addition to Delphi's extensive online encyclopedia. If you need facts and figures for a term paper or article, then Delphi is the place to go.

Of course, you'll find many of the same types of news, financial, advisory and travel-related services that are offered



Source: *RUN* Editorial Survey, May 1989.
Percentages total more than 100% due to multiple responses.

on the other boards. Delphi's reference guide is over 450 pages long, so the chances are that any service you require from a commercial board is available here.

Telecomputing Tips

All in all, there's a wealth of information available online to the Commodore enthusiast, and it's as close as your telephone. But keep in mind that, while the initial investment is relatively small, telecomputing can become expensive unless you use it with care. Try your hand at local BBSs to get comfortable with your terminal program before attempting national networks. BBSs are superb training grounds and offer a much more intimate setting for new users. Ask your questions there, and get to know your local online experts.

Having made the decision to join a national information service, you should carefully read their manual (if they supply one) and then monitor your time online. Keep in mind that each minute costs you money, and it's very easy to lose track of that valuable time. To keep your bills at a minimum, don't call commercial boards during prime-time hours; they charge up to $35 an hour for prime-time access. Moreover, avoid downloading files from a national network until you check your local BBS. Why spend an hour and $10 or $12 downloading what's available free from a local source?

I must admit that my telephone bills have jumped significantly since I became hooked on telecomputing. But considering the convenience and all the information and software I've acquired, I look upon it as money well spent. I think you will, too. ■

John Ryan, one of RUN*'s contributing editors, is an air traffic control instructor when he's not online or writing for the magazine.*

Table 3. Popular public domain downloads.

IN A RECENT MONTH, the files listed below were downloaded most often from the Commodore libraries of four large networks. As you can see, users were enthusiastic about terminal programs, disk utilities and Doodle! graphics files.

QuantumLink
1. DM/L—disk menu loader
2. Budget V.2—budget program
3. 3-D Menu Make—menu program
4. World Conquest—Risk-like game
5. Geolist2.0—GEOS utility

PeopleLink
1. CCGMS 8.8—terminal program
2. GGmichelle—graphics
3. JJbodis1.sda—graphics
4. Telefan1/4.mus—music
5. VDC Upgrade.txt—general interest

GEnie
1. Desterm102.arc—terminal program
2. DDgoforit—graphics
3. DDDream—graphics
4. Novaterm 8.2.SDA—terminal program
5. Library 128 v1.3a—utility

CompuServe
1. DTS128—cataloging program
2. DRZCK.IN—1571 ROM-checking program
3. UTILT.BIN—Basic 7.0 utility
4. FBACKUP, v. 2—three-minute disk back-up
5. 128LYN.BIN—Lynx file utility

Table 4. Major on-line information services.

NAMES, ADDRESSES AND PHONE NUMBERS for some of the most popular information services are listed below, along with their fees. Rates are hourly, except as otherwise indicated. PT stands for prime-time, NPT for non-prime-time. The telephone numbers listed are *information* numbers, not service access numbers.

Keep in mind that Telenet offers a special service, called PC Pursuit, that enables frequent users to connect to computers in over 75 cities nationwide without incurring long-distance charges. Some information networks (such as PeopleLink) even charge lower access rates if you connect via PC Pursuit. Telenet asks $30 for signing up, then $30 a month for 30 hours of access or $50 a month for 60 hours of access, plus an additional $3 for every hour over 60 in the month.

CompuServe
CompuServe Information Services
PO Box 20212
5000 Arlington Center Blvd.
Columbus, OH 43220
800-848-8199
Membership fee (including kit): $39.95
300 baud: PT and NPT, $6
1200/2400 baud: PT and NPT, $12.50
Additional charge for some executive services.

QuantumLink
QuantumLink Computer Services
8620 Westwood Center Drive
Vienna, VA 22180
800-392-8200
Flat monthly fee of $9.95, which includes 1 hour of "plus" time.
Plus-time service (300/1200 baud): 8¢ a minute.

GEnie
General Electric Information Service
401 North Washington St.
Arlington Heights, IL 60004
800-638-9636
Membership fee: $29.95
300 baud: PT, $18; NPT, $5
1200 baud: PT, $18; NPT, $6
2400 baud: PT, $18; NPT, $10
Additional charge for some gateway services.

American PeopleLink
3215 N. Frontage Rd., Suite 1505
Rockville, MD 20850
800-524-0100
Membership fee: $24.95
Redi-Access, 300/1200/2400 baud: PT, $17.95; NPT, $4.95/$5.95/$9.95
Telenet, 300/1200/2400 baud: PT, $19.95; NPT, $6.95/$7.95/$13.95
"Frequent Plinker" rates: 25 percent off
PC Pursuit users are charged a flat hourly fee of $3.50.

Delphi
Three Blackstone St.
Cambridge, MA 02139
800-544-4005
Membership fee: $49.95
All bauds: PT, $17.40; NPT, $7.20
Premium services: $21
The Delphi Advantage plan offers unlimited access to basic services for $24 a month.

Foosball 64

If your goal is to have a ball, try playing Table Soccer.

By TONY BRANTNER

Do you crave the thrill of athletic competition, but hate working up a sweat? Then take on either another armchair athlete or your C-64 in Table Soccer, a computer simulation of the tabletop simulation of the fast-paced field game. If you play against another person, two joysticks are needed; if you play against the computer, plug the one joystick into port 2.

The number of players and the ball speed—1 for slow and 2 for fast—are chosen at the opening menu. When you're playing the computer, you can also choose a skill level from 1, the easiest, to 9. For each choice, move joystick 2 up or down to display the number you want, then press the firebutton.

At the start of play, and after each goal, the ball is placed in the center of the field. During play, joystick 2 controls the yellow team and joystick 1 or the computer controls the red. Each team has three lines of players, but at any given time only the line that's closest to the ball is active. Move your joystick up or down to shift your active line from side to side, and press the firebutton to kick the ball toward the opposing goal.

The on-screen action seems so real.

One point is awarded for each goal, and the first player to score nine points is the winner. To play again, press the firebutton on joystick 2.

You can freeze play at any time by pressing the Commodore key, and then continue playing by pressing it again. The run-stop key returns you to the opening menu. R

Tony Brantner is a carpenter by trade and a self-taught computer programmer. He enjoys the C-64 particularly for its excellent graphics capabilities.

Running Instructions: **Type in Listing 1 and save it to disk. Then run it to write a file called Soccer ML. To play, load and run Soccer ML.**

Listing 1. Table Soccer program. (Available on ReRun disk. See card at page 36.)

```
Ø REM THIS LISTING CREATES (AND
   SHOULD NOT BE CALLED) SOCCER
   64                    :REM*1Ø2
5 OPEN 8,8,8,"SOCCER 64,P,W"
                         :REM*28
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                     :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1       :REM*141
15 IF LEN(A$)<62 THEN 55
                         :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)    :REM*242
25 FOR I=1 TO 3Ø         :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                         :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55             :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55             :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                         :REM*67
5Ø NEXT:GOTO 1Ø          :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                  :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø            :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                         :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                         :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55             :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                         :REM*148
95 NEXT:GOTO 1Ø          :REM*16Ø
1ØØ REM SOCCER ML DATA   :REM*155
1Ø1 DATA Ø1Ø8ØBØ8ØAØØ9E323Ø36*3
   1ØØØØØØA9Ø82ØD2FF2Ø*9DØEAØØ
   Ø98994ØØ3C8CØ         :REM*86
1Ø2 DATA CØ9ØF8A2Ø7AØØØBD883E*4
   9FF994ØØ3C8C8C8CA1Ø*F2AØØD8
   CF8Ø7C88CF9Ø7         :REM*27
1Ø3 DATA C88CFAØ7A9Ø18D1BDØ8D*2
   7DØA9Ø68D17DØ8D1DDØ*A9Ø78D2
   8DØA9Ø28D29DØ         :REM*75
1Ø4 DATA A9ØØ8D1CDØ8D2ØDØ8D23*D
   ØA9ØA8D22DØA9932ØD2*FFA9ØØ8
   DF81Ø8D15DØA2         :REM*12
1Ø5 DATA Ø3AØØ6182ØFØFFA926AØ*1
   Ø2Ø1EABA2Ø8AØØB182Ø*FØFFA99
   6AØØF2Ø1EABA9         :REM*38
1Ø6 DATA Ø22Ø6FØD8CF51ØA2ØA98*D
   Ø17AØØB182ØFØFFA9AA*AØØF2Ø1
   EABA9Ø92Ø6FØD         :REM*136
1Ø7 DATA 8CF61ØA2ØCAØØB182ØFØ*F
   FA9BBAØØF2Ø1EABA9Ø2*2Ø6FØDB
   93BØF8DF71ØA9         :REM*116
1Ø8 DATA 932ØD2FFADF51ØDØ18A2*Ø
   ØAØ1Ø182ØFØFFA9C9AØ*ØF2Ø1EA
   B18ADF61Ø6931         :REM*212
1Ø9 DATA 2ØD2FFAØØØA9ØØ9928D8*9
   928D99928DAA9AØ9928*Ø49928Ø►
```

RUN it right: **C-64; one or two joysticks**

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FOOSBALL 64

```
    59928Ø6C8DØE7        :REM*17
11Ø DATA AØ21A9Ø1992BD899FBDA*8
    81ØF7A215AØØ6182ØFØ*FFA926A
    Ø1Ø2Ø1EABA9ØØ         :REM*184
111 DATA 8DF91Ø8DFA1Ø2Ø4AØDA9*Ø
    58DF81ØAØ12A9ØØ99FB*1Ø881ØF
    A2Ø41ØEA9B48D         :REM*25
112 DATA Ø211A9828DØ111A9ØA8D*Ø
    6118DØ711A5A229Ø18D*ØA11A5A
    24A29Ø18DØB11         :REM*1Ø4
113 DATA 2Ø1AØEA9Ø78D15DØ2ØE1*F
    FDØØ34C69Ø8AD8DØ229*Ø2FØ11A
    D8DØ2DØFBAD8D         :REM*2
114 DATA Ø229Ø2FØF9AD8DØ2DØFB*E
    6Ø3DØ14ADØ711C9Ø49Ø*Ø3CEØ71
    1ADØ611C9Ø49Ø         :REM*232
115 DATA Ø3CEØ611A5Ø3293FDØ1A*2
    ØE7ØAADØØDC8DFB1ØAD*Ø1DC8DF
    C1ØADF51ØDØØ3         :REM*16
116 DATA 2Ø6DØA2Ø11ØB2Ø36Ø2Ø*7
    BØC2Ø1AØEAØ6488DØFD*ACØ211A
    EØ311DØØ7CØ3A         :REM*221
117 DATA B08E4CE8Ø9CØ3Ø9Ø872Ø*Ø
    AØEA9FØ8DØ6D4A9118D*Ø4D4A9Ø
    185Ø4A5Ø485Ø5         :REM*6
118 DATA A5Ø5ØAØA8DØ1D4EEF81Ø*A
    9Ø22Ø2CØDC6Ø5DØEDE6*Ø4A5Ø4C
    9ØC9ØE12ØØAØE        :REM*48
119 DATA A9Ø58DF81ØAEØ311FEF9*1
    Ø2Ø4AØDA9Ø62Ø2CØDAE*Ø311BDF
    91ØA829Ø7DØE7         :REM*1Ø6
12Ø DATA CØ48BØØ34C39Ø9A218AØ*Ø
    F182ØFØFFA2ØEAØ1ØA5*Ø44A9ØØ
    4A21AAØ1Ø8A2Ø         :REM*152
121 DATA 1EABA91E2ØC2ØDE6Ø4AD*Ø
    ØDC291ØDØD92ØE6ØD4C*69Ø8EEØ
    411ADØ411C9Ø9         :REM*49
122 DATA BØØ6A91F8DFC1Ø6ØADF6*1
    Ø8DØ41138ADØ111E93E*4A4A4A8
    5Ø2A95Ø853BA9         :REM*36
123 DATA Ø4853CA9ØØ85Ø4A9FF8D*Ø
    511ACØØ11C8B13BC94D*FØ28A5Ø
    4C5Ø2DØØ7A9ØØ         :REM*152
124 DATA AØØF4CC6ØA9ØØ7E5Ø2AØ*1
    E4CC6ØA38A5Ø2E5Ø4AØ*1DCDØ51
    1BØØ68DØ5118C         :REM*17Ø
125 DATA FC1Ø18A53B6928853BA5*3
    C69ØØ853CE6Ø4A5Ø4C9*119ØB96
    ØA91AACØ311DØ         :REM*61
126 DATA ØFACØ211CØDCBØØ8A91Ø*C
    Ø8CBØØ2A9Ø6ACFD1ØDØ*Ø38DFF1
    ØACFE1ØDØØ618         :REM*74
127 DATA 69Ø58DØØ116ØA9Ø185Ø6*A
    6Ø6BDFF1Ø85FEBDFD1Ø*DØØ7BDF
    B1Ø291ØDØØ32Ø         :REM*121
128 DATA 48ØBA6Ø6BDFB1Ø29Ø3C9*Ø
    2DØØ62ØA2ØB4C43ØBC9*Ø1DØØ32
    ØE5ØBC6Ø61ØCE         :REM*239
129 DATA 6Ø18A95Ø65FE853BA9Ø4*6
    9ØØ853CA6Ø6BDFD1ØØA*187DFD1
    ØEØØØFØØ31869         :REM*14
13Ø DATA 1885Ø2A91185Ø4AØØ1B1*3
    BC94DFØØFA6Ø2AØØØBD*66ØF913
    BE8C8CØØ39ØF5         :REM*81
131 DATA 18A53B6928853BA53C69*Ø
    Ø853CC6Ø4DØD8A6Ø618*BDFD1Ø6
    9Ø129Ø79DFD1Ø         :REM*94
132 DATA 6Ø18A95Ø853B69288539*A
    9Ø4853C69ØØ853AA4FE*C8B13BC
    94DFØØ16ØA91Ø         :REM*184
133 DATA 85Ø4A2Ø3A4FEB139913B*C
    8CADØF818A539853B69*288539A
    53A853C69ØØ85         :REM*153
134 DATA 3AC6Ø4DØDF4C25ØC38A9*D
    Ø853BE9288539A9Ø685*3CE9ØØ8
    53AA4FEC8B13B         :REM*194
135 DATA C94DFØØ16ØA91Ø85Ø4A2*Ø
    3A4FEB139913BC8CADØ*F838A53
    9853BE9288539         :REM*174
136 DATA A53A853CE9ØØ853AC6Ø4*D
    ØDFA4FEA92Ø913BC8A9*4D913BC
    8A92Ø913B6Ø18         :REM*196
137 DATA ADØ9116DØ7118DØ9119Ø*2
    2ACØB1118ADØ111793D*ØFA8AEØ
    211ADØ3112ØØE         :REM*174
138 DATA ØDC9AØFØØB2ØC8ØCBØØ5*A
    5FB8DØ1116ØADØB1149*Ø129Ø18
    DØB11ADØ7114A         :REM*255
139 DATA Ø9Ø18DØ7114CCDØD18AD*Ø
    8116DØ6118DØ8119Ø2A*ACØA111
    8ADØ211793DØF         :REM*11
14Ø DATA AAADØ311793FØFACØ111*2
    ØØEØDC9AØFØ1Ø2ØC8ØC*BØØAA5F
    C8DØ211A5FD8D         :REM*164
141 DATA Ø3116ØADØA1149Ø129Ø1*8
    DØA11ADØ6114AØ9Ø18D*Ø6114CC
    DØDC94Ø9Ø17AØ         :REM*23
142 DATA ØØC94A9Ø13C94E9ØØDC8*C
    9529ØØAC9559Ø04C95B*9ØØ2186
    ØADF71ØCCØA11         :REM*44
143 DATA DØØ5CDØ611FØF18CØA11*8
    DØ611A5A22DF71ØØ9Ø1*8DØ711A
    5A229Ø18DØB11         :REM*1Ø9
144 DATA 2ØCAØD386Ø84FB86FC85*F
    DA9ØØ85A7A9Ø485A838*98E92E4
    A4A4AA818A5A7         :REM*81
145 DATA 692885A7A5A869ØØ85A8*8
    8DØFØ388AE91485Ø2A5*FDE9Ø04
    A66Ø246Ø246Ø2         :REM*22Ø
146 DATA A4Ø2B1A76ØAEFA1ØA98Ø*A
    ØØ32Ø5BØDAEF91ØA9CØ*AØØ3853
    B843CAØØØBD8Ø         :REM*13Ø
147 DATA 39913BE8C8C8C8CØ189Ø*F
    36Ø8DØC11AØØØ8CØD11*C88C86Ø
    2A92Ø2ØD2FFA9         :REM*162
148 DATA 9D2ØD2FFA9Ø52ØC2ØD18*A
    DØD1169312ØD2FFA99D*2ØD2FFA
    9Ø52ØC2ØDADØØ         :REM*226
149 DATA DC291FC9ØFFØ1529Ø3A8*1
    8ADØD117941ØFCDØC11*BØC68DØ
    D114C7BØD2ØE6         :REM*99
15Ø DATA ØDACØD116Ø1865A2C5A2*D
    ØFC6ØA92A2CA916482Ø*ØAØE688
    DØ1D4A9Ø28DØ5         :REM*223
151 DATA D4A21Ø8EØ4D4E88EØ4D4*6
    Ø2ØØAØEA9ØE8DØ1D4A9*FØ8DØ6D
    4A9118DØ4D4A9         :REM*181
152 DATA ØF2ØC2ØDA91Ø8DØ4D4AD*Ø
    ØDC291ØFØF96ØA017A9*ØØ99ØØD
    4881ØFAA9ØF8D         :REM*134
153 DATA 18D46ØADØ1118DØ1DØAD*Ø
    2118DØØDØADØ311Ø9Ø4*8D1ØDØA
    97E8DØ3DØ8DØ5         :REM*27
154 DATA DØA91C8DØ2DØA9448DØ4*D
    Ø6ØA2Ø2AØØØ182ØFØFF*A91185Ø
    4A9D2AØØF2Ø1E         :REM*236
155 DATA ABCØ4DØF5AØØØA2Ø5A9*2
    Ø9944Ø59963Ø5189869*28A8CAD
    ØFØA9ØA85Ø4A4         :REM*161
156 DATA Ø4BE45ØFB95ØØFA8182Ø*F
    ØFFA9Ø4AØ1Ø2Ø1EABA4*Ø4BE45Ø
    FB95BØFA8182Ø         :REM*1Ø4
157 DATA FØFFA9Ø9AØ1Ø2Ø1EABC6*Ø
    41ØD46ØADØEDC29FE8D*ØEDCA5Ø
    129FB85Ø1A9DØ         :REM*144
158 DATA 853AA938853CAØØØ8439*8
    43BA2Ø8B139913BC8DØ*F9E63AE
    63CCADØF2A5Ø1         :REM*197
159 DATA Ø9Ø485Ø1ADØEDCØ9Ø18D*Ø
    EDCAØ6FB9851Ø99ØØ3A*997Ø3A8
    81ØF4AD16DØØ9         :REM*221
16Ø DATA 1Ø8D16DØAD18DØ29FØØ9*Ø
    E8D18DØ78A9138D14Ø3*A9ØF8D1
    5Ø3A9ØØ8D12DØ         :REM*137
161 DATA A91B8D11DØA9818D1ADØ*5
    86ØAD19DØ8D19DØ3ØØ7*ADØDDC5
    84C31EAAØ3EA2         :REM*248
162 DATA ØØAD12DØC9CEBØØ5AØCE*A
    EF81Ø8C12DØ8E21DØ4C*BCFE1F3
    FØ1FFØØFFØØØ1         :REM*195
163 DATA FFØØØ7ØAØDØ4Ø7ØAØD1Ø*Ø
    6ØAØEØ6Ø6Ø61Ø1Ø1Ø1Ø*1Ø1A1A1
    A1F1F1F151515         :REM*117
164 DATA 1515ØBØBØB4748492Ø4Ø*2
    Ø414243444546414243*2Ø4Ø2Ø4
    748494A4B4C4F         :REM*73
165 DATA 5Ø512Ø4E2Ø5556575859*5
    A555657204E2Ø4F5Ø51*5253549
    C484F572Ø4D41         :REM*4Ø
166 DATA 4E592Ø5Ø4C4159455253*3
    F2ØØØ9E4C4556454C2Ø*4F462Ø5
    Ø4C41593F2ØØØ         :REM*43
167 DATA 1C42414C4C2Ø535Ø4545*4
    43F2ØØØØ54C4556454C*2Ø2ØØØ1
    D1D1D12Ø52Ø2Ø         :REM*19
168 DATA 922Ø9B2ØCD2Ø2Ø2Ø962Ø*C
    D2Ø2Ø2Ø9B2ØCD2Ø2Ø2Ø*962ØCD2
    Ø2Ø2Ø9B2ØCD2Ø         :REM*253
169 DATA 2Ø2Ø962ØCD2Ø2Ø12Ø52Ø*2
    ØØDØØ9BCACBCCØØ96D2*D3D4ØØ9
    E47414D452Ø2Ø         :REM*165
17Ø DATA 4F564552ØØ1C5Ø524553*5
    32Ø4649524500 9FBC12*2Ø92BE1
    2C32Ø922Ø122Ø         :REM*164
171 DATA 92A212A192A112B5CØ92*A
    12Ø122ØCØB5BBB4A2B4*A2B5CØ9
    2A1122ØCØ92A1         :REM*191
172 DATA ØD2Ø2Ø2Ø2Ø2Ø2Ø2Ø122Ø*9
    22Ø12BC2Ø92BB122ØBE*A1BCB59
    2A2BB2ØA2122Ø         :REM*65
173 DATA B5BEB492A212B492A212*B
    592A2BB122Ø92DF12DF*ØDØØ3CF
    FEBEBEBEBFF3C         :REM*81
174 DATA Ø3Ø3ØAØAØAØAØ3Ø3D4D4*7
    E7E7E7ED4D4ØØ2Ø6Ø6Ø*6Ø6Ø2ØØ
    ØØ3Ø397979797         :REM*19
175 DATA Ø3Ø3E5E5FEFEFEFEE5E5*Ø
    ØØ2969696962ØØØØØ8*Ø9Ø9Ø9Ø
    9Ø8ØØ1717BDBD         :REM*153
176 DATA BDBD1717CØCØAØAØAØAØ*C
    ØCØØØ8Ø969696968ØØØ*5B5BBFB
    FBFBF5B5BCØCØ         :REM*5
177 DATA D6D6D6D6CØCØ28282828*2
    8282828ØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ         :REM*188
178 DATA ØØØØØØØØØØØØØØØØ
                          :REM*129
179 DATA -1               :REM*33
```

■

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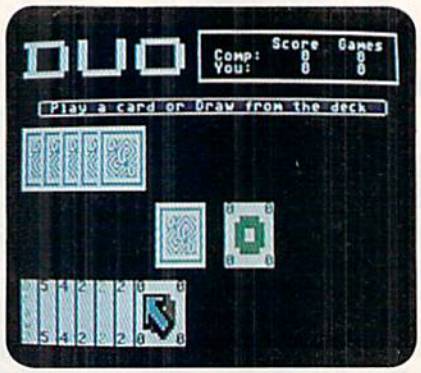

Use your wild cards well in Duo.

By ROBERT COOK

Duo, the C-64 version of the card game Uno, is designed for two players—you and the computer. The object is to be first to score 100 points or more. You score points by winning a hand, which happens when you're first to play all your cards or when your opponent's hand grows to 18 cards or more. You can play from the keyboard or with a joystick plugged into port 2.

The Duo deck contains 100 cards—eight each of 0–9, Skip a Turn and Draw 2 Cards, plus four Wild cards. All but the Wild cards belong to either the red, blue, green or yellow suit. You determine a Wild card's suit when it's played.

The computer deals the first hand; then the winner of each subsequent hand deals. Each player gets six cards per hand, and an additional card is placed face-up beside the deck to start the discard pile.

At your turn, you may either play a card to the discard pile or draw a card from the deck. You may discard anything that matches the top card on the pile in either color, number or action (Skip or Draw 2), and a Wild card may be played at any time.

To discard, first choose a card by moving the arrow onto it using either the keyboard or the joystick. With the keyboard, press the horizontal cursor key to move the arrow right and the vertical cursor key to move it left. With the joystick, press the lever right or left. Press the return key or the joystick firebutton to play the card. If you try to play an illegal card, a buzzer will alert you to your mistake.

If you can't or don't want to discard, press the ↑ key or push the joystick up to move the arrow onto the deck; then press return or the firebutton to draw a card. You can move the arrow off the deck before drawing by pressing shift/↑ or pushing the joystick down.

When you play a number or Wild card or draw a card, your turn ends, but if you play a Skip or Draw 2 card, your opponent forfeits a turn, and you can go again right away. Draw 2 also makes your opponent draw two extra cards from the deck.

As I mentioned, a Wild card can be played at any time. After you play it, cycle through the colors and press return or the firebutton to assign it the color you want it to have.

If you play out your cards, your score is the total value of your opponent's hand. If your opponent's hand gets too big, your score is the difference between the values of the hands, assuming your opponent's larger. Card values are: 0–9, face value; action cards, 20 points; wild cards, 50 points.

No matter how play ends, the winner receives an additional 10 points just for winning, while the loser receives no points at all. After the score display is updated, press return or the firebutton to begin the next hand. When all the cards in the deck are drawn, a hand ends with no winner. The first player to score 100 points wins. To play another game, press Y at the prompt. Otherwise press N to return to Basic. R

Robert Cook is a draftsman and printed circuit board designer who has been programming for about four years.

Running Instructions: **Type in Listing 1, using *RUN*'s Checksum, save it to disk and run it.**

Listing 1. Duo program. (Available on ReRun disk. See card at page 36.)

```
10 REM DUO 64 - ROBERT B. COOK
                          :REM*131
20 POKE5328Ø,11:POKE53281,1:POK
   E53265,11              :REM*164
30 GOSUB162Ø:GOSUB2Ø4Ø:POKE5326
   5,27                   :REM*109
40 GOSUB1Ø1Ø              :REM*88
50 POKE646,4-(PU=2)*4:PRINTEL$:
   ONPUGOSUB9Ø,51Ø:POKESP,Ø
                          :REM*68
60 IFYC=ØORMC=ØORYC>17ORMC>17TH
   ENGOSUB121Ø:GOTO4Ø     :REM*23
70 IFDP=1ØØTHENGOSUB91Ø:GOTO4Ø
                          :REM*157
80 PU=3-PU:GOTO5Ø         :REM*111
90 POKESX,3Ø:POKESY,218:POKESP,
   1:MV=1:SK=Ø:POKESB,Ø:REM*156
100 PRINTLEFT$(CR$,7)"{3 CRSR R
    Ts}{CTRL 9}{CTRL 5}{SHFT P}
    LAY A CARD OR {SHFT D}RAW F
    ROM THE DECK{CTRL Ø}":GOSUB
    95Ø                   :REM*73
110 GETG$:JS=PEEK(5632Ø)AND31:I
    FG$=""ANDJS=31THEN11Ø
                          :REM*144
120 IFG$="{UP ARROW}"ORJS=3ØTHE
    NPOKESX,15Ø:POKESY,17Ø:POKE
    SB,Ø:GOTO11Ø          :REM*13
130 IFG$="{CRSR RT}"ORJS=23THEN
    MV=MV+1:IFMV>YCTHENMV=1
```

RUN it right: **C-64; joystick optional**

```
                              :REM*71
14Ø IFG$="{CRSR DN}"ORJS=27THEN
    MV=MV-1:IFMV<1THENMV=YC
                              :REM*47
15Ø FORL=1TO5Ø:NEXT:T=14+MV*16:
    T1=Ø:IFT>255THENT=T-255:T1=
    1                         :REM*13Ø
16Ø IFG$<>CHR$(13)ANDJS<>15THEN
    POKESX,T:POKESY,218:POKESB,
    T1:GOTO11Ø                :REM*184
17Ø PRINTEL$                  :REM*66
18Ø IFPEEK(SY)=17ØTHENYC=YC+1:Y
    C(YC)=DK(DP):DP=DP+1:GOSUB3
    2Ø:RETURN                 :REM*229
19Ø IFCV(YC(MV))<>12ANDCV(YC(MV
    ))<>CV(UC)ANDCC$(YC(MV))<>C
    C$(UC)THEN29Ø             :REM*253
2ØØ PRINTLEFT$(CR$,15)TAB(21)"{
    CTRL 2}"+CD$(YC(MV))
                              :REM*251
21Ø PRINTLEFT$(CR$,15)TAB(21)CC
    $(YC(MV))+CD$(YC(MV))
                              :REM*238
22Ø UC=YC(MV):YC=YC-1:IFYCTHENG
    OSUB31Ø:GOTO24Ø           :REM*6
23Ø PRINTLEFT$(CR$,25)EC$;
                              :REM*113
24Ø IFCV(UC)=12ANDYCTHENGOSUB4Ø
    Ø                         :REM*188
25Ø IFCV(UC)=11THENGOSUB46Ø
                              :REM*76
26Ø IFCV(UC)=1ØANDYCTHENGOSUB48
    Ø                         :REM*51
27Ø IFSK=1ANDYC>ØANDMC<18ANDDP<
    1ØØTHEN9Ø                 :REM*168
28Ø RETURN                    :REM*167
29Ø PRINTLEFT$(CR$,7),"{CTRL 9}
    {CTRL 5}{SHFT C}HOOSE ANOTH
    ER CARD{CTRL Ø}":GOSUB99Ø
                              :REM*23Ø
3ØØ FORL=ØTO999:NEXT:GOTO9Ø
                              :REM*171
31Ø FORL=MVTOYC+1:YC(L)=YC(L+1)
    :NEXT:GOTO35Ø             :REM*67
32Ø FORL=1TOYC-1:FORK=L+1TOYC
                              :REM*66
33Ø IFCV(YC(L))<CV(YC(K))THENT=
    YC(L):YC(L)=YC(K):YC(K)=T
                              :REM*15Ø
34Ø NEXT:NEXT                 :REM*211
35Ø T=Ø:FORL=1TOYC            :REM*123
36Ø IFL<19THENPRINTLEFT$(CR$,21
    )TAB((L-1)*2)CL$(T)+CC$(YC(
    L))+CD$(YC(L));           :REM*1Ø9
37Ø T=1:NEXT:IFYC<18THENPRINTEE
    $;                        :REM*2Ø6
38Ø IFYC=19THENPRINTLEFT$(CR$,1
    5)TAB(34)CC$(YC(19))+CD$(YC
    (19));                    :REM*246
39Ø RETURN                    :REM*22
4ØØ POKESP,Ø:T=Ø:PRINTLEFT$(CR$
    ,7)TAB(13)"{CTRL 9}{CTRL 5}
    {SHFT C}HOOSE A COLOR{CTRL
    Ø}":GOSUB95Ø              :REM*4Ø
41Ø GETG$:JS=PEEK(5632Ø)AND31:I
    FG$=""ANDJS=31THEN41Ø
                              :REM*38
42Ø IF(G$=CHR$(13)ORJS=15)ANDT>
    ØTHENPRINT"{CTRL 5}"EL$:GOT
    O45Ø                      :REM*5Ø
43Ø T=T+1+(T=4)*4:T$=MID$("{COM
    D 3}{CTRL 6}{COMD 7}{CTRL 8
    }",T,1):WC$=T$:PRINTLEFT$(C
    R$,15)TAB(21)T$CD$(UC)
                              :REM*125
44Ø CC$(UC)=T$:GOSUB95Ø:GOTO41Ø
                              :REM*119
45Ø WAIT5632Ø,16:WAIT197,64:RET
    URN                       :REM*152
46Ø PRINTLEFT$(CR$,7)TAB(12)"{C
    TRL 9}{CTRL 5}{SHFT I} TAKE
     TWO CARDS{CTRL Ø}":GOSUB95
    Ø:FORS=ØTO999:NEXT        :REM*136
47Ø FORJ=1TO2:IFDP<1ØØTHENMC=MC
    +1:MC(MC)=DK(DP):DP=DP+1:GO
    SUB76Ø:NEXT               :REM*192
48Ø IFYC=ØORMC>17ORDP>99THEN5ØØ
                              :REM*2Ø1
49Ø PRINTLEFT$(CR$,7),"{CTRL 9}
    {CTRL 5}{SHFT Y}OU GET ANOT
    HER TURN{CTRL Ø}":GOSUB95Ø:
    FORS=ØTO999:NEXT          :REM*149
5ØØ SK=-(DP<1ØØ):RETURN       :REM*54
51Ø PRINTLEFT$(CR$,7)TAB(14)"{C
    TRL 9}{COMD 1}{SHFT I}T'S M
    Y TURN{CTRL Ø}":GOSUB97Ø:FO
    RS=ØTO999:NEXT            :REM*92
52Ø SK=Ø:MV=1:T=1             :REM*44
53Ø FORL=1TOMC:IFCV(MC(L))<1ØTH
    EN58Ø                     :REM*125
54Ø IFCV(MC(L))<>CV(UC)ANDCC$(M
    C(L))<>CC$(UC)ORCV(MC(L))=1
    2THEN57Ø                  :REM*1Ø2
55Ø FORK=L+1TOMC:IFCC$(MC(K))=C
    C$(MC(L))ORCV(MC(K))=CV(MC(
    L))THENMV=L:GOTO64Ø:REM*246
56Ø NEXT                      :REM*176
57Ø T=L+1:NEXT:IFYC<3THENT=1
                              :REM*148
58Ø FORL=TTOMC:IFCV(MC(L))=CV(U
    C)ANDCV(MC(L))<>12ANDMC(L)T
    HENMV=L:GOTO64Ø           :REM*67
59Ø IFCC$(MC(L))=CC$(UC)THENMV=
    L:GOTO64Ø                 :REM*148
6ØØ NEXT:IFT<>1THENT=1:GOTO58Ø
                              :REM*98
61Ø IFCV(MC(1))=12THENMV=1:GOTO
    64Ø                       :REM*136
62Ø PRINTLEFT$(CR$,7)TAB(11)"{C
    TRL 9}{COMD 1} {SHFT I}'LL
    DRAW A CARD {CTRL Ø}":GOSUB
    97Ø:FORS=ØTO999:NEXT
                              :REM*176
63Ø MC=MC+1:MC(MC)=DK(DP):DP=DP
    +1:GOSUB76Ø:RETURN        :REM*5Ø
64Ø PRINTLEFT$(CR$,7)TAB(11)"{C
    TRL 9}{COMD 1} {SHFT I}'LL
    PLAY A CARD {CTRL Ø}":GOSUB
    97Ø:FORS=ØTO999:NEXT
                              :REM*124
65Ø IFYC=1ANDCV(MC(1))=12THENMV
    =1                        :REM*4Ø
66Ø PRINTLEFT$(CR$,15)TAB(21)"{
    CTRL 2}"+CD$(MC(MV));
                              :REM*69
67Ø PRINTLEFT$(CR$,15)TAB(21)CC
    $(MC(MV))+CD$(MC(MV));
                              :REM*44
68Ø UC=MC(MV):MC=MC-1:IFMCTHENG
    OSUB75Ø:GOTO7ØØ           :REM*166
69Ø PRINTLEFT$(CR$,13)EC$
                              :REM*247
7ØØ IFCV(UC)=12ANDMCTHENGOSUB81
    Ø                         :REM*41
71Ø IFCV(UC)=11THENGOSUB86Ø
                              :REM*66
72Ø IFCV(UC)=1ØANDYCTHENGOSUB88
    Ø                         :REM*37
73Ø IFSK=1ANDMC>ØANDYC<18ANDDP<
    1ØØTHEN52Ø                :REM*153
74Ø RETURN                    :REM*113
75Ø FORL=MVTOMC+1:MC(L)=MC(L+1)
    :NEXT:GOTO79Ø             :REM*92
76Ø FORL=1TOMC-1:FORK=L+1TOMC
                              :REM*234
77Ø IFCV(MC(L))<CV(MC(K))THENT=
    MC(L):MC(L)=MC(K):MC(K)=T
                              :REM*59
78Ø NEXT:NEXT                 :REM*141
79Ø IFMC<19THENPRINTLEFT$(CR$,9
    )TAB((MC-1)*2)BK$;:IFMC<18T
    HENPRINTEE$;              :REM*28
8ØØ RETURN                    :REM*173
81Ø T1=Ø:T$="":FORL=1TO4:T=Ø:FO
    RK=1TOMC                  :REM*16Ø
82Ø IFCC$(MC(K))=MID$("{COMD 3}
    {CTRL 6}{COMD 7}{CTRL 8}",L
    ,1)THENT=T+1              :REM*76
83Ø NEXT:IFT>T1THENT1=T:T$=MID$
    ("{COMD 3}{CTRL 6}{COMD 7}{
    CTRL 8}",L,1)             :REM*2
84Ø NEXT:IFT$=""THENT$=MID$("{C
    OMD 3}{CTRL 6}{COMD 7}{CTRL
     8}",INT(RND(1)*4+1),1)
                              :REM*192
85Ø PRINTLEFT$(CR$,15)TAB(21)T$
    +CD$(UC):CC$(UC)=T$:RETURN
                              :REM*211
86Ø PRINTLEFT$(CR$,7)TAB(11)"{C
    TRL 9}{COMD 1}{SHFT Y}OU TA
    KE TWO CARDS{CTRL Ø}":GOSUB
    97Ø:FORS=ØTO999:NEXT
                              :REM*152 ►
```

DUO

```
87Ø FORJ=1TO2:IFDP<1ØØTHENYC=YC
    +1:YC(YC)=DK(DP):DP=DP+1:GO
    SUB32Ø:NEXT          :REM*56
88Ø IFMC=ØORYC>17ORDP>99THEN9ØØ
                         :REM*231
89Ø PRINTLEFT$(CR$,7)TAB(11)"{C
    TRL 9}{COMD 1}{SHFT I} GET
    ANOTHER TURN{CTRL Ø}":GOSUB
    97Ø:FORS=ØTO999:NEXT
                         :REM*155
9ØØ SK=-(DP<1ØØ):RETURN:REM*135
91Ø PRINTLEFT$(CR$,19)TAB(14)EC
    $:PRINTLEFT$(CR$,7)"{CTRL 4
    }"EL$                :REM*142
92Ø PRINTLEFT$(CR$,7)TAB(7)"{CT
    RL 9}{SHFT N}O MORE CARDS,
    HAND DUMPED"         :REM*46
93Ø FORL=1TO6:GOSUB97Ø:GOSUB95Ø
    :NEXT                :REM*98
94Ø GOSUB144Ø:RETURN     :REM*57
95Ø POKESR,24Ø:POKEWV,17:POKEHF
    ,5Ø:POKELF,35:POKEAT,Ø
                         :REM*5Ø
96Ø FORS=1TO99:NEXT:POKEWV,16:P
    OKESR,Ø:RETURN       :REM*2
97Ø POKEVL,15:POKEAT,Ø:POKESR,2
    25:POKEWV,17:POKEHF,33:POKE
    LF,33                :REM*1Ø4
98Ø FORS=1TO99:NEXT:POKEWV,16:R
    ETURN                :REM*6Ø
99Ø POKEHF,5:POKEAT,Ø:POKESR,24
    Ø:POKEWV,33          :REM*91
1ØØØ FORS=1TO5ØØ:NEXT:POKEWV,32
    :RETURN              :REM*238
1Ø1Ø T=RND(-TI):SYS9ØØ   :REM*74
1Ø2Ø PRINTLEFT$(CR$,7)"{CTRL 4}
    "EL$:PRINTLEFT$(CR$,7)TAB(
    11)"{CTRL 9}{SHFT S}HUFFLI
    NG THE DECK{CTRL Ø}"
                         :REM*227
1Ø3Ø GOSUB95Ø:GOSUB97Ø   :REM*196
1Ø4Ø FORL=1TO1ØØ:T=INT(RND(1)*1
    ØØ+1):T1=DK(L):DK(L)=DK(T)
    :DK(T)=T1:NEXT       :REM*145
1Ø5Ø FORL=1TO19:YC(L)=Ø:MC(L)=Ø
    :NEXT                :REM*14Ø
1Ø6Ø T=Ø:FORL=1TO12STEP2:T=T+1:
    YC(T)=DK(L):MC(T)=DK(L+1):
    NEXT                 :REM*166
1Ø7Ø FORL=1TO5:FORK=L+1TO6
                         :REM*15Ø
1Ø8Ø IFCV(YC(L))<CV(YC(K))THENT
    =YC(L):YC(L)=YC(K):YC(K)=T
                         :REM*217
1Ø9Ø IFCV(MC(L))<CV(MC(K))THENT
    =MC(L):MC(L)=MC(K):MC(K)=T
                         :REM*25Ø
11ØØ NEXT:NEXT:PRINTLEFT$(CR$,7
    )"{CTRL 4}"EL$       :REM*125
111Ø T=Ø:FORL=1TO6       :REM*3
112Ø PRINTLEFT$(CR$,21)TAB((L-1
    )*2)CL$(T)+CC$(YC(L))+CD$(
    YC(L));              :REM*116
113Ø PRINTLEFT$(CR$,9)TAB((L-1)
    *2)BK$               :REM*77
114Ø T=1:NEXT{16 SPACEs}:REM*59
115Ø IFCV(DK(13))<1ØTHEN117Ø
                         :REM*47
116Ø T1=INT(RND(1)*85+16):T=DK(
    13):DK(13)=DK(T1):DK(T1)=T
    :GOTO115Ø            :REM*1Ø5
117Ø PRINTLEFT$(CR$,15)TAB(14)B
    K$                   :REM*47
118Ø PRINTLEFT$(CR$,15)TAB(21)C
    C$(DK(13))+CD$(DK(13))
                         :REM*3
119Ø MC=6:YC=6:UC=DK(13):DP=14
                         :REM*78
12ØØ RETURN              :REM*59
121Ø IFMC=ØTHEN125Ø      :REM*25Ø
122Ø T=Ø:FORL=1TOMC      :REM*8Ø
123Ø IFL<19THENPRINTLEFT$(CR$,9
    )TAB((L-1)*2)CL$(T)+CC$(MC
    (L))+CD$(MC(L))      :REM*1Ø2
124Ø T=1:NEXT            :REM*159
125Ø POKE646,4-(MC=ØORYC>17)*4:
    PRINTLEFT$(CR$,7)TAB(2)EL$
                         :REM*34
126Ø T=Ø:FORL=ØTOYC:T1=CV(YC(L)
    )                    :REM*19Ø
127Ø IFT1<1ØTHENT=T+T1   :REM*57
128Ø IFT1=1ØORT1=11THENT=T+2Ø
                         :REM*9
129Ø IFT1=12THENT=T+5Ø   :REM*134
13ØØ NEXT:YT=T           :REM*218
131Ø T=Ø:FORL=ØTOMC:T1=CV(MC(L)
    )                    :REM*227
132Ø IFT1<1ØTHENT=T+T1   :REM*111
133Ø IFT1=1ØORT1=11THENT=T+2Ø
                         :REM*55
134Ø IFT1=12THENT=T+5Ø   :REM*2ØØ
135Ø NEXT:MT=T           :REM*232
136Ø IFYC>17THENYT=YT-MT:IFMT<Ø
    THENMT=Ø             :REM*151
137Ø IFMC>17THENMT=MT-YT:IFYT<Ø
    THENYT=Ø             :REM*5Ø
138Ø IFYC>ØANDMC<18THEN142Ø
                         :REM*46
139Ø PRINTLEFT$(CR$,7)TAB(1Ø)"{
    CTRL 9}{SHFT Y}OU SCORE"MT
    +1Ø"POINTS":GOSUB95Ø:GOSUB
    95Ø                  :REM*1Ø1
14ØØ YS=YS+MT+1Ø:PU=2:IFYS>99TH
    ENYG=YG+1            :REM*167
141Ø IFMC>ØANDYC<18THEN144Ø
                         :REM*166
142Ø PRINTLEFT$(CR$,7)TAB(11)"{
    CTRL 9}{SHFT I} SCORE"YT+1
    Ø"POINTS":GOSUB97Ø:GOSUB97
    Ø                    :REM*15
143Ø MS=MS+YT+1Ø:PU=1:IFMS>99TH
    ENMG=MG+1            :REM*24Ø
144Ø FORL=ØTO2999:NEXT:FORL=97T
    O1ØØ:CC$(L)="{CTRL 1}":NEX
    T:SK=Ø:GOSUB159Ø     :REM*193
145Ø POKE198,Ø:IFMS>99ORYS>99TH
    EN15ØØ               :REM*194
146Ø PRINTLEFT$(CR$,7)"{CTRL 4}
    "EL$:PRINTLEFT$(CR$,7)TAB(
    1Ø)"{CTRL 9}{SHFT P}RESS {
    SHFT F}{SHFT I}{SHFT R}{SH
    FT E} OR {SHFT R}{SHFT E}{
    SHFT T}{SHFT U}{SHFT R}{SH
    FT N}"               :REM*185
147Ø GOSUB95Ø:GOSUB97Ø   :REM*146
148Ø GETG$:JS=PEEK(5632Ø)AND31:
    IFG$<>CHR$(13)ANDJS<>15THE
    N148Ø                :REM*21
149Ø RETURN              :REM*1Ø2
15ØØ IFYS>MSTHENPRINTLEFT$(CR$,
    7)TAB(4)"{CTRL 9}{CTRL 5}{
    SHFT Y} O U{3 SPACEs}W I N
    {3 SPACEs}T H E{3 SPACEs}G
     A M E!"             :REM*111
151Ø IFMS>YSTHENPRINTLEFT$(CR$,
    7)TAB(6)"{CTRL 9}{COMD 1}{
    SHFT I}{3 SPACEs}W I N{3 S
    PACEs}T H E{3 SPACEs}G A M
     E!"                 :REM*1Ø
152Ø POKE896,MG:POKE897,YG:POKE
    898,PU:GOSUB158Ø     :REM*41
153Ø FORL=1TO1Ø:GOSUB95Ø:GOSUB9
    7Ø:NEXT:FORL=ØTO3999:NEXT
                         :REM*161
154Ø PRINTLEFT$(CR$,7)"{CTRL 4}
    "EL$:PRINTLEFT$(CR$,7)TAB(
    11)"{CTRL 9}{SHFT P}LAY AG
    AIN?{2 SPACEs}[Y/N]"
                         :REM*252
155Ø GOSUB95Ø:GOSUB97Ø   :REM*194
156Ø POKE198,Ø:WAIT198,1:GETG$:
    IFG$<>"N"THENRUN     :REM*174
157Ø END:GAME            :REM*2
158Ø MG=PEEK(896):YG=PEEK(897):
    PU=PEEK(898)         :REM*243
159Ø PRINTLEFT$(CR$,3)TAB(27)"{
    CTRL 9}{COMD 4}"RIGHT$(" "
    +STR$(MS),3)TAB(34)MG
                         :REM*12
16ØØ PRINTLEFT$(CR$,4)TAB(67)"{
    CTRL 9}{COMD 4}"RIGHT$(" "
    +STR$(YS),3)TAB(74)YG
                         :REM*186
161Ø RETURN              :REM*222
162Ø DIM T,T1,T2,L,K,J,DP,MC,YC
    ,MT,YT,MS,YS,MG,YG,PU,MV,J
    S,SK,G$,T$,WC$       :REM*125
163Ø DIM CD$(1ØØ),CC$(1ØØ),CV(1
    ØØ),DK(1ØØ),MC(2Ø),YC(2Ø)
                         :REM*1Ø3
164Ø BK$="{CTRL 4}{COMD A}{3 SH
    FT *s}{COMD S}{5 CRSR LFs}
    {CRSR DN}{SHFT -}{CTRL 9}{
    SHFT D}{SHFT LB.}{COMD *}{
    CTRL Ø}{SHFT -}{5 CRSR LFs
    }{CRSR DN}{SHFT -}{CTRL 9}
    {SHFT LB.}{SHFT U}{SHFT LB
    .}{CTRL Ø}{SHFT -}{5 CRSR
    LFs}{CRSR DN}{SHFT -}{CTRL
     9}{COMD *}{SHFT LB.}{SHFT
     O}{CTRL Ø}{SHFT -}{5 CRSR
     LFs}{CRSR DN}{COMD Z}{3 S
    HFT *s}{COMD X}"     :REM*246
165Ø EE$="{CTRL 9}{COMD 4}{2 SP
    ACEs}{2 CRSR LFs}{CRSR UP}
    {2 SPACEs}{2 CRSR LFs}{CRS
    R UP}{2 SPACEs}{2 CRSR LFs
    }{CRSR UP}{2 SPACEs}{2 CRS
    R LFs}{CRSR UP}{2 SPACEs}{
    CTRL Ø}"             :REM*68
166Ø EC$="{CTRL 9}{COMD 4}{5 SP
    ACEs}{5 CRSR LFs}{CRSR UP}
    {5 SPACEs}{5 CRSR LFs}{CRS
    R UP}{5 SPACEs}{5 CRSR LFs
    }{CRSR UP}{5 SPACEs}{5 CRS
    R LFs}{CRSR UP}{5 SPACEs}{
    CTRL Ø}"             :REM*28 ►
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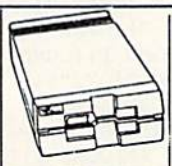

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167Ø EL$="{HOME}{6 CRSR DNs}{2
     CRSR RTs}{CTRL 9}{36 SPACE
     s}{CTRL Ø}"          :REM*196
168Ø CL$(1)="{COMD 5}{CRSR LF}{
     COMD N}{CRSR LF}{CRSR DN}{
     COMD N}{CRSR LF}{CRSR DN}{
     COMD N}{CRSR LF}{CRSR DN}{
     COMD N}{CRSR LF}{CRSR DN}{
     COMD N}{4 CRSR UPs}"
                          :REM*1ØØ
169Ø E$="{5 CRSR LFs}{CRSR DN}"
     :CR$="{HOME}{24 CRSR DNs}"
                          :REM*11Ø
17ØØ LF=54272:HF=54273:WV=54276
     :AT=54277:SR=54278:REM*177
171Ø SP=53269:SX=53248:SY=53249
     :SB=53264            :REM*252
172Ø POKE54296,15:POKE2Ø4Ø,13:P
     OKE53287,Ø:POKESP,Ø
                          :REM*114
173Ø POKE53276,1:POKE53285,3:PO
     KE53277,Ø:POKE53271,1
                          :REM*165
174Ø FORL=1TO96STEP8:C$="":FORK
     =1TO4:READD$:C$=C$+D$+E$:N
     EXT:READD$           :REM*211
175Ø FORK=ØTO7:CD$(L+K)=C$+D$:C
     C$(L+K)=MID$("{2 COMD 3s}{
     2 CTRL 6s}{2 COMD 7s}{2 CT
     RL 8s}",K+1,1):CV(L+K)=T
                          :REM*178
176Ø NEXT:T=T+1:NEXT      :REM*235
177Ø C$="":FORK=1TO4:READD$:C$=
     C$+D$+E$:NEXT:READD$
                          :REM*22
178Ø FORL=97TO1ØØ:CD$(L)=C$+D$:
     CC$(L)="{CTRL 1}":CV(L)=12
     :NEXT                :REM*72
179Ø FORL=1TO1ØØ:DK(L)=L:NEXT
                          :REM*18
18ØØ IFPEEK(1Ø24)=16ØTHEN184Ø
                          :REM*242
181Ø FORL=832TO897:READK:POKEL,
     K:NEXT               :REM*246
182Ø FORL=9ØØTO933:READK:POKEL,
     K:NEXT               :REM*17
183Ø PU=1:POKE898,1       :REM*217
184Ø RETURN               :REM*185
185Ø DATA "Ø{3 SPACEs}Ø","{CTR
     L 9}{COMD V}{COMD C}{CTRL
     Ø}","{CTRL 9}{CTRL Ø}
     {CTRL 9}{CTRL Ø}","{CTR
     L 9}{COMD F}{COMD D}{CTRL
     Ø}","Ø{3 SPACEs}Ø"
                          :REM*36
186Ø DATA "1{3 SPACEs}1","{COM
     D D}{CTRL 9}{CTRL Ø}{2 SP
     ACEs}","{2 SPACEs}{CTRL 9}
     {CTRL Ø}{2 SPACEs}","{CO
     MD D}{CTRL 9}{CTRL Ø}{COM
     D F}","1{3 SPACEs}1"
                          :REM*228
187Ø DATA "2{3 SPACEs}2","{CTR
     L 9}{COMD V}{COMD O}{COMD
     C}{CTRL Ø}","{CTRL 9}{2
     COMD Us}{COMD D}{CTRL Ø}"
     ,"{CTRL 9}{2 COMD Us}{CT
     RL Ø}","2{3 SPACEs}2"
                          :REM*2
188Ø DATA "3{3 SPACEs}3","{CTR
     L 9}{COMD V}{COMD O}{COMD
     C}{CTRL Ø}","{2 SPACEs}{S
     HFT *}{CTRL 9}{SHFT *}{CTR
     L Ø}","{CTRL 9}{COMD F}{
     COMD U}{COMD D}{CTRL Ø}",
     "3{3 SPACEs}3"       :REM*24
189Ø DATA "4{3 SPACEs}4","{CTR
     L 9}{COMD Y}{COMD K}{CTRL
     Ø}{COMD K}","{CTRL 9}{C
     OMD V}{COMD C}{CTRL Ø}","
     {2 SPACEs}{CTRL 9}{COMD K}
     {CTRL Ø}{COMD K}","4{3 SP
     ACEs}4"              :REM*29
19ØØ DATA "5{3 SPACEs}5","{CTR
     L 9}{2 COMD Ps}{CTRL Ø}"
     ,"{CTRL 9}{2 COMD Ps}{COM
     D C}{CTRL Ø}","{CTRL 9}{
     COMD F}{COMD Y}{COMD D}{CT
     RL Ø}","5{3 SPACEs}5"
                          :REM*29
191Ø DATA "6{3 SPACEs}6","{CTR
     L 9}{COMD V}{COMD O}{COMD
     C}{CTRL Ø}","{CTRL 9}{C
     TRL Ø}{SHFT *}{CTRL 9}{COM
     D U}{CTRL Ø}","{CTRL 9}{
     COMD F}{COMD Y}{COMD D}{CT
     RL Ø}","6{3 SPACEs}6"
                          :REM*181
192Ø DATA "7{3 SPACEs}7","{CTR
     L 9}{COMD @}{COMD O}{CTRL
     Ø}","{2 SPACEs}{CTRL 9}{
     COMD K}{CTRL Ø}{COMD K}",
     "{2 SPACEs}{CTRL 9}{CTRL
     Ø}{2 SPACEs}","7{3 SPACEs}
     7"                   :REM*131
193Ø DATA "8{3 SPACEs}8","{CTR
     L 9}{COMD V}{COMD O}{COMD
     C}{CTRL Ø}","{CTRL 9}{SH
     FT *}{CTRL Ø}{SHFT *}{CTRL
     9}{SHFT *}{CTRL Ø}","{C
     TRL 9}{COMD F}{COMD U}{COM
     D D}{CTRL Ø}","8{3 SPACEs
     }8"                  :REM*1Ø6
194Ø DATA "9{3 SPACEs}9","{CTR
     L 9}{COMD V}{COMD O}{COMD
     C}{CTRL Ø}","{CTRL 9}{CO
     MD O}{CTRL Ø}{SHFT *}{CTRL
     9}{CTRL Ø}","{CTRL 9}{
     COMD F}{COMD U}{COMD D}{CT
     RL Ø}","9{3 SPACEs}9"
                          :REM*1Ø4
195Ø DATA "{SHFT S}{4 SPACEs}",
     "K{CTRL 9}{COMD V}{COMD P}
     {COMD @}{CTRL Ø}{SHFT T}",
     "I{CTRL 9}{COMD F}{SHFT A}
     {COMD C}{CTRL Ø}U","P{CTRL
     9}{COMD T}{COMD Y}{COMD D
     }{CTRL Ø}R","{4 SPACEs}N"
                          :REM*219
196Ø DATA "{SHFT D}{3 SPACEs}{S
     HFT C}","R{CTRL 9}{COMD I
     }{COMD C}{CTRL Ø}A","A{CTR
     L 9}{CTRL Ø}{CTRL 9}{CT
     RL Ø}R","W{CTRL 9}{CTRL Ø
     }{COMD I}{CTRL 9}{COMD D}{
     CTRL Ø}D","2{3 SPACEs}S"
                          :REM*2Ø
197Ø DATA "{SHFT W}{4 SPACEs}",
     "I{CTRL 9}{CTRL Ø}{CTRL
     9}{CTRL Ø}{SHFT C}","L{CT
     RL 9}{COMD G}{CTRL Ø}{SHFT
     -}{CTRL 9}{COMD M}{CTRL Ø
     }A","D{CTRL 9}{COMD J}{SHF
     T -}{COMD L}{CTRL Ø}R","{4
     SPACEs}D"            :REM*22
198Ø DATA 17Ø,17Ø,128,149,Ø85,1
     28,149,1Ø6,128,149,1Ø6,128
     ,149,Ø9Ø,ØØØ,149     :REM*29
199Ø DATA Ø86,128,153,Ø85,16Ø,1
     54,Ø85,1Ø4,154,149,Ø9Ø,17Ø
     ,165,Ø9Ø,168,169     :REM*8Ø
2ØØØ DATA 1Ø6,ØØØ,Ø42,168,ØØØ,Ø
     1Ø,16Ø,ØØØ,ØØ2,128,ØØØ,ØØØ
     ,ØØØ,ØØØ,ØØØ,ØØØ    :REM*246
2Ø1Ø DATA ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,Ø
     ØØ,ØØØ,ŁØØ,ØØØ,ØØØ,ØØØ,ØØØ
     ,ØØØ,ØØØ,ØØØ,Ø,Ø,Ø:REM*156
2Ø2Ø DATA 162,17Ø,169,11,157,63
     ,217,157,233,217,157,147,2
     18,157,61,219,169 :REM*2Ø1
2Ø3Ø DATA 16Ø,157,63,5,157,233,
     5,157,147,6,157,61,7,2Ø2,2
     Ø8,225,96            :REM*115
2Ø4Ø PRINT"{SHFT CLR}{CTRL N}{C
     TRL 9}{COMD 4}{18 SPACEs}{
     COMD A}{2Ø SHFT *s}{COMD S
     }";                  :REM*75
2Ø5Ø PRINT"{CTRL Ø}{COMD F}{COM
     D D}{2 COMD Is}{COMD C}{CT
     RL 9} {CRSR RT}{3 SPACEs}{
     CRSR RT} {CTRL Ø}{COMD V}{
     3 COMD Is}{COMD C}{CTRL 9}
     {SHFT -}{7 SPACEs}{SHFT S
     }CORE{2 SPACEs}{SHFT G}AME
     S {SHFT -}";         :REM*157
2Ø6Ø PRINT"{CTRL Ø}{COMD K}{CTR
     L 9}{COMD K}{2 SPACEs}{CRS
     R RT} {CRSR RT}{3 SPACEs}{
     CRSR RT} {CRSR RT}{3 SPACE
     s}{CRSR RT} {SHFT -} {SHFT
     C}OMP:{14 SPACEs}{SHFT -}
     ";                   :REM*216
2Ø7Ø PRINT"{CTRL Ø}{COMD V}{COM
     D C}{CTRL 9}{2 COMD Is}{CT
     RL Ø}{COMD D}{CTRL 9} {CTR
     L Ø}{COMD F}{CTRL 9}{3 COM
     D Is}{CTRL Ø}{COMD D}{CTRL
     9} {CTRL Ø}{COMD F}{CTRL
     9}{3 COMD Is}{CTRL Ø}{COMD
     D}{CTRL 9} {SHFT -} {SHFT
     Y}OU:{15 SPACEs}{SHFT -}"
     ;                    :REM*56
2Ø8Ø PRINT"{CTRL 9}{18 SPACEs}{
     COMD Z}{2Ø SHFT *s}{COMD X
     }";                  :REM*236
2Ø9Ø PRINT"{CTRL 9}{2 SPACEs}{3
     6 COMD @s}{2 SPACEs}";
                          :REM*111
21ØØ PRINT"{CTRL 9} {COMD M}{36
     SPACEs}{COMD G} ";
                          :REM*212
211Ø PRINT"{CTRL 9}{2 SPACEs}{3
     6 COMD Ts}{2 SPACEs}"
                          :REM*166
212Ø GOSUB158Ø:SYS9ØØ:RETURN
                          :REM*2Ø5
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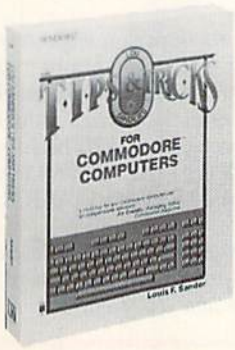

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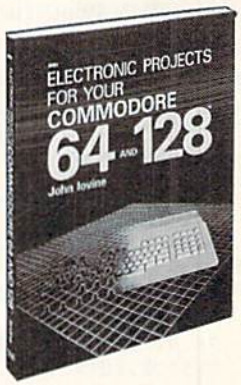

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Super Fonts

Now RUN Paint users can create characters that are over four times the size of those in regular Commodore character sets.

By ROBERT ROCKEFELLER

RUN Paint can use two types of fonts: normal Commodore character sets and 16-bit fonts that are four times as big.

Creating the 16-bit fonts requires a RUN Paint work disk and a font file saved on that disk. Type in Listing 1 and save it to the RUN Paint work disk. Run it once to create a file named "RPU. CONVERT16" on that disk. Next, load and run RUN Paint. Then re-insert the work disk with the "RPU.CONVERT16" file on it. To execute, click on UTILITY on the DISK LOAD submenu and CONVERT16 on the utility screen.

After the utility executes, you get a prompt saying "hires or medres (h/m) ?". Enter h to convert a character set to a 16-bit font for use in Hi-Res mode, or m to do the same thing in Med-Res mode. A list of all the font files on the disk will appear.

Click on the font you wish to convert. The converted file will output to the disk with a slightly different filename. For example, an 8-bit font that's named RPF. ITALICS converts to a 16-bit hi-res font named RPF.HBITALICS and to a medres font named RPF.MBITALICS. R

Robert Rockefeller has contributed many articles and programs to RUN, *most notably RUN Script and RUN Paint.*

Listing 1. Font-conversion utility program. (Available on ReRun disk. See card at page 36.)

```
Ø REM THIS PROGRAM CREATES (AND
   SHOULD NOT BE CALLED) RPU.CO
  NVERT16                 :REM*1Ø8
5 OPEN 8,8,8,"RPU.CONVERT16,P,W
  "                       :REM*3Ø
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                       :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1         :REM*141
15 IF LEN(A$)<62 THEN 55
                           :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)      :REM*242
25 FOR I=1 TO 3Ø           :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                           :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55               :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55               :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                           :REM*67
5Ø NEXT:GOTO 1Ø            :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                    :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø              :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                           :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                           :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55               :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55               :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                           :REM*148
95 NEXT:GOTO 1Ø            :REM*16Ø
1ØØ REM HEX LOADER FOR 16-BIT R
   UNPAINT FONTS           :REM*242
1Ø1 DATA ØØ6C4C946C9399434F4E*5
   64552543A2Ø43484152*4143544
   55253ØDD3D4C1           :REM*31
1Ø2 DATA D4D5D33AØDCØCØCØCØ*C
   ØCØCØCØCØCØCØCØCØ*CØCØCØC
   ØCØCØCØCØCØCØ           :REM*48
1Ø3 DATA CØCØCØCØCØCØCØCØCØ*C
   ØCØCØCØCØØDØØ13ØDØD*ØDØD124
   8924952455320           :REM*131
1Ø4 DATA 4F522Ø124D9245445245*5
   33F2ØØØ2C5Ø2C57525Ø*462Ø522
   E522EØFØØØØØ3           :REM*66
1Ø5 DATA ØCØF3Ø333C3FCØC3CCCF*F
   ØF3FCFFØØØ1Ø4Ø51Ø11*14154Ø4
   144455Ø515455           :REM*64
1Ø6 DATA 2ØFC6DA24BAØ6CA9Ø12Ø*B
   C26FØF2EØ48FØØ7EØ4D*DØEAA91
   Ø2CA9ØØ8D2E6E           :REM*97
1Ø7 DATA 2ØFC6DA9Ø32Ø2A289ØØ1*6
   Ø2ØFC6DAØØ2AEDC14A9*7E2ØBAF
   F2ØCØFF9ØØ34C           :REM*116
1Ø8 DATA CA272Ø23279ØØ8A97E2Ø*C
   3FF4CE127A9FF2ØØ36E*AØØ28C3
   16EB9346ED968           :REM*124
1Ø9 DATA 6CDØØ5C8CØØA9ØF3CØØA*D
   Ø13B9346EC8C9Ø7FØØ8*A97E2ØC
   3FF4CF2278C31           :REM*188
11Ø DATA 6EAC291588B913159915*1
   5CØØ7BØF5AD2E6EFØØ3*A94D2CA
   948991315A942           :REM*39
111 DATA 991415AD2915186ØØ6C9*1
   69ØØ2A9168D2915A8A2*Ø3BD666
   C99121588CA1Ø           :REM*153
112 DATA F6AD2915A213AØ152ØBD*F
   FAØØ3AEDC14A97F2ØBA*FF2ØCØF
   F9ØØ34CCA272Ø           :REM*184
113 DATA 7529BØDFA27F2ØC9FFBØ*F
   1A96Ø2ØD2FF2ØD2FFA2*6AAØ6C2
   ØAØ26A9ØØ8D3Ø           :REM*123
114 DATA 6EAD3Ø6EC9649ØØD2ØCC*F
   FA97E2ØC3FFA97F4CC3*FFA9ØØ8
   D2F6EAC316EB9           :REM*64
115 DATA 346EAA29FØ4A4A4A4A18*6
   D2E6EA8B9746C2ØD2FF*488A29Ø
   F186D2E6EA8B9           :REM*113
116 DATA 746C2ØD2FFAA682ØD2FF*8
   A2ØD2FFEE316EAD316E*CD336E9
   Ø122C326E7ØAE           :REM*49
117 DATA 2ØCCFFA9FF2ØØ36EA27F*2
   ØC9FFEE2F6EAD2F6EC9*Ø89ØA9E
   E3Ø6EDØ8BFØ9Ø           :REM*227
118 DATA A2Ø3AØ6C4CAØ268D336E*A
   27E2ØC6FFAØØØ8C316E*2ØE4FF9
   9346EC8A59Ø8D           :REM*191
119 DATA 326E249Ø7ØØ5CC336E9Ø*E
   B8C336EØ82ØCCFF286Ø :REM*43
12Ø DATA -1                :REM*233 ■
```

RUN it right: **C-64 or C-128; printer; RUN Paint work disk containing a font file**

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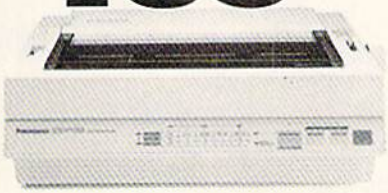

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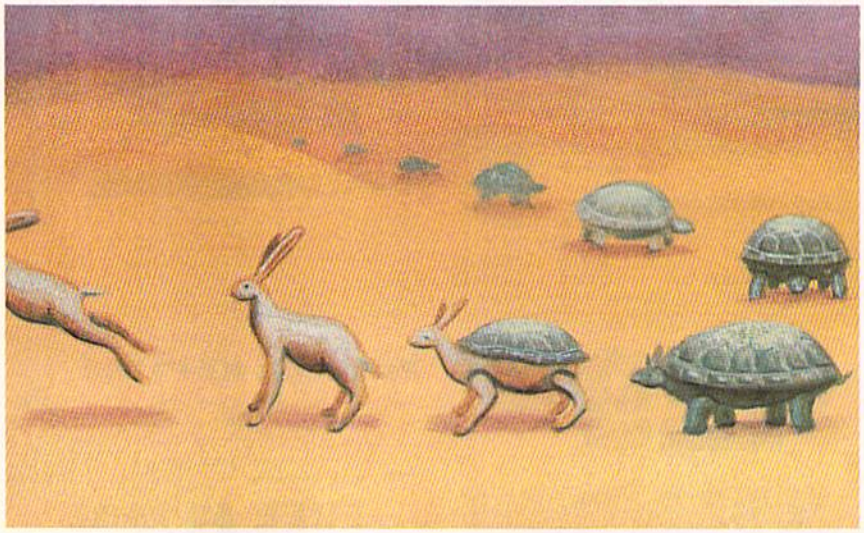
Fast-40

Speed up your C-128 40-Column-mode programs even if you're in 64 mode.

By BRET TIMMINS



One of the best features of the C-128 is its speed increase over earlier Commodore computers when plowing through a lot of data or recalculating numbers frequently. However, in 40-Column mode, the extra speed comes with a trade-off: The VIC-II, the graphics chip that handles 40-column displays, won't work properly at speeds higher than 1 MHz (Slow mode) and must be turned off during 2 MHz (Fast mode).

To alleviate this situation, I've written Fast-40, a small machine language program for the C-128 that speeds up 40-column Basic and machine language programs from 20 to 100 percent. In the process, it keeps all or part of the screen visible, the amount depending on the speed increase chosen.

There are separate versions of Fast-40 for 128 and 64 modes. You'll find them in Listing 1 and Listing 2, respectively. Type in the version you need, using *RUN*'s Checksum program to detect any typing errors, and save it to disk. Then run the version you need to create the appropriate machine language program. See the running instructions with the listings for the loading command for each program.

Speeding Things Up

Although nothing appears to change after running Fast-40, your C-128 is processing data about 20 percent faster than its normal 40-column speed. This is the maximum speed at which Fast-40 can operate and still display the entire screen.

To speed processing further, hold down the control key and press the plus key. A blank, light gray line will cover the first row of the screen. Pressing control/plus again will blank the second line of the screen, and so on. Each blank line represents a speed increase of three to four percent. Control/plus can be held down until all but the bottom row of the screen is blank, for a 98 percent increase in speed over normal 1 MHz mode.

To decrease the speed and see more of the screen, press control/minus. Holding down control/minus for a couple of seconds will return the screen to normal, but leave the processing speed 20 percent faster.

You can, from within a program, set the speed at which Fast-40 operates by poking memory location 6415 in the 128-mode version, or 52515 in the 64 version, with a value from 50 to 242. Fast-40 uses this value to determine how many lines should be blank on the screen. The default value is 50—no blank lines and a 20 percent speed increase. The maximum value is 242—24 blank lines and a 98 percent speed increase. For smooth screen transitions, this memory location should be poked only with values from 50 to 242 that are in increments of eight: 50, 58, 66, 74, and so on.

If you need still more speed, you can achieve full 2 MHz mode by pressing control/F. This blanks the entire screen in the current border color. Press shift/control/F to return to 1 MHz mode. You can turn on full Fast mode when you're in Program mode with SYS 6403 for the 128 version, or SYS 52503 for the 64 version; SYS 6406 (128) or SYS 52506 (64) turns it off.

Caveats

Although I made Fast-40 as uncrashable as I could, there are times when it should be disabled. Peripherals (disk drives, printers, modems, and such) require precise timing to work properly, and Fast-40 can throw this timing off. In 128 mode, this isn't much of a problem, since the operating system automatically sets 1 MHz mode each time it accesses a peripheral. However, the screen will get messy.

In 64 mode, the operating system thinks it's always working at 1 MHz, so it'll lock up if Fast-40 is active during ►

RUN it right: **C-128 in 40-Column mode or C-128 in 64 mode.**

ILLUSTRATED BY PAUL COZZOLINO

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peripheral access. Fast-40 tries to prevent this by disabling itself whenever a Load, Save or Open command is issued, either in Basic or machine language, but some programs bypass those commands and call peripherals with other routines. Fast-40 will lock up with such programs unless it's disabled before any peripheral operations are performed.

The control/X command will temporarily turn Fast-40 off while the 128 talks to peripherals, and shift/control/X will turn it back on. In Program mode, use SYS 6409 (SYS 52509 in 64 mode) to disable Fast-40, and use Fast-40's starting address, SYS 6400 (SYS 52500 in 64 mode), to turn it back on again.

Because Fast-40 is an interrupt-driven program, it can occasionally miss and not display a change from one graphics mode to another—a change from Hi-Res Graphics to Text mode, for example. This is rare and happens only in 64 mode. Once again, control/X will temporarily disable Fast-40 before a graphics change takes place.

Note that, in 128 mode, Split-Screen Graphics modes 2 and 4 are not available with Fast-40.

Interrupt Driven

Fast-40 works by telling the C-128 to generate two raster interrupts—one at the bottom of the screen and one somewhere near the top. The bottom interrupt sets 2 MHz mode, checks for control keys and tells the VIC chip to display hi-res graphics.

For some unknown reason, hi-res graphics that are displayed at 2 MHz by the VIC chip show up as blank, light gray lines. The top raster interrupt restarts 1 MHz mode and also resets the VIC chip. Ⓡ

Bret Timmins is a free-lance programmer with a particular interest in programs that extend the capabilities of Commodore computers.

Running Instructions: **Type in Listing 1 or Listing 2, as needed, and save it to disk. Run the listing you need to create the machine language file, which is then loaded with the command BLOAD "FAST-40.128" (enabled with SYS 6400) or with LOAD "FAST-40.64",8,1:NEW:SYS 52500.**

Listing 1. Fast-40 ML creator program, 128-mode version. (Available on ReRun disk. See card at page 36.)

```
Ø REM THIS LISTING CREATES (AND
   SHOULD NOT BE CALLED) FAST4Ø
  -128                    :REM*142
5 OPEN 8,8,8,"FAST4Ø-128,P,W"
                          :REM*119
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                      :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1        :REM*141
15 IF LEN(A$)<62 THEN 55
                          :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)     :REM*242
25 FOR I=1 TO 3Ø          :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*67
5Ø NEXT:GOTO 1Ø           :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                   :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø             :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                          :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*148
95 NEXT:GOTO 1Ø           :REM*16Ø
1ØØ REM FAST 4Ø 128 MODE ML
                          :REM*144
1Ø1 DATA ØØ194C1219A9CØ2CA9Ø1*2
   CA98Ø8DDB1A6Ø32FAØØ*78A9478
   D14Ø3A9198D15          :REM*146
1Ø2 DATA Ø3AD1Ø198D12DØAD11DØ*2
   97F8D11DØAD1ADØØ9Ø1*8D1ADØA
   9FF8D19DØA9Ø2          :REM*111
1Ø3 DATA 8D11198DDA1AA9ØØ8DDB*1
   A586ØD8AD19DØ29Ø18D*19DØAC1
   119B9D21A8D61          :REM*147
1Ø4 DATA 19C8B9D21A8D62194CØØ*Ø
   ØAD16DØ29EFØDD71A8D*16DØAD1
   1DØ29DFØDD61A          :REM*57
1Ø5 DATA 8D11DØA9ØØ8D3ØDØA9Ø2*8
   D1119AD1Ø198D12DØAD*11DØ297
   F8D11DØ4C33FF          :REM*195
1Ø6 DATA A9Ø18D3ØDØAD11DØØ92Ø*8
   D11DØAD16DØ29EF8D16*DØ2ØDC1
   AAØØ52CDB1A7Ø          :REM*24
1Ø7 DATA 6B3Ø5ØA5D3C9Ø4DØ4DA5*D
   4C94ØFØ47C928DØ1ACE*D81ADØ3
   E8CD81AADØF19          :REM*145
1Ø8 DATA C9F2FØ3418ADØF1969Ø8*8
   DØF19DØ29C92BDØ1ACE*D91ADØ2
   Ø8CD91AADØF19          :REM*2Ø7
1Ø9 DATA C932FØ1638ADØF19E9Ø8*8
   DØF19DØØBC915FØ1DC9*17DØØ34
   C7A1AA9ØØ8D11          :REM*178
11Ø DATA 19ADØF198D12DØAD11DØ*2
   97F8D11DØ4CC71AA94C*8D14Ø3A
   91A8D15Ø3AD11          :REM*43
111 DATA DØ29EF8D11DØAD11DØ29*D
   FØDD61A8D11DØAD16DØ*29EFØDD
   71A8D16DØ2Ø2C          :REM*17Ø
112 DATA 1B4CC71AAD19DØ29Ø18D*1
   9DØADDB1AC9Ø1FØØCA5*D3C9Ø5D
   ØE5A5D4C915DØ          :REM*213
113 DATA DFA9ØØ8D3ØDØAD11DØØ9*1
   Ø8D11DØ2Ø12194C33FF*A9ØØ8D3
   ØDØ8DDA1AAD16          :REM*39
114 DATA DØ29EFØDD71A8D16DØAD*1
   1DØ29DFØDD61AØ91Ø8D*11DØA9A
   A8D14Ø3A91A8D          :REM*89
115 DATA 15Ø32Ø2C1B4CC71AAD19*D
   Ø29Ø18D19DØA5D3C9Ø5*DØØCA5D
   4C917DØØ62Ø12          :REM*182
116 DATA 194CC71A2Ø2C1BA9ØØ8D*D
   B1A2Ø2CC24C69FA6319*9419ØØØ
   ØØ5Ø5ØØØØA5D8          :REM*97
117 DATA 48292Ø8DD61AFØ1ØAD2D*Ø
   A8D18DØA5Ø129FDØ9Ø4*85Ø1DØ1
   ØAD2CØA8D18DØ          :REM*15Ø
118 DATA A5Ø129FBØ9Ø2Ø5D985Ø1*6
   8298ØFØØ2A91Ø8DD71A*ADDA1AD
   Ø16AD11DØ29DF          :REM*227
119 DATA ØDD61A8D11DØAD16DØ29*E
   FØDD71A8D16DØ6Ø2ØDC*1AAD1Ø1
   98D12DØAD11DØ          :REM*2Ø2
12Ø DATA 297F8D11DØ6Ø      :REM*117
121 DATA -1                :REM*232
```

Listing 2. Fast-40 ML creator program, 64-mode version. (Available on ReRun disk. See card at page 36.)

```
Ø REM THIS LISTING CREATES (AND
   SHOULD NOT BE CALLED) FAST4Ø
  -64                     :REM*8Ø
5 OPEN 8,8,8,"FAST4Ø-64,P,W"
                          :REM*147
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                      :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1        :REM*141
15 IF LEN(A$)<62 THEN 55
                          :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)     :REM*242
25 FOR I=1 TO 3Ø          :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
```

```
                              :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55                  :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55                  :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                              :REM*67
50 NEXT:GOTO 10               :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                       :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70                 :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                              :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                              :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55                  :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55                  :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
                              :REM*148
95 NEXT:GOTO 10               :REM*160
100 REM FAST 40 64 MODE ML
                              :REM*33
101 DATA 14CD4C26CDA9C02CA901*2
    CA9808D44CF6032FA00*A9C78D1
    803A9CE8D1903             :REM*172
102 DATA A9E68D1A03A9CE8D1B03*A
    9D88D3003A9CE8D3103*A9E803
    203A9CE8D3303             :REM*45
103 DATA A97F8D0DDCA9838D1403*A
    9CD8D1503AD24CD8D12*0AD11D
    0297F8D11D0AD             :REM*253
104 DATA 1AD009018D1AD0A9FF8D*1
    9D0A9028D25CDA9008D*44CF60A
    D19D08D19D0AC             :REM*42
105 DATA 25CDB93CCF8D9ACDC8B9*3
    CCF8D9BCD4C0000A900*8D30D0A
    D16D029EF0D41             :REM*223
106 DATA CF8D16D0AD11D029DF0D*4
    0CF8D11D0A9028D25CD*AD24CD8
    D12D0AD11D029             :REM*124
107 DATA 7F8D11D04C81EAA9018D*3
    0D0AD11D0292080D40CF*AD16D02
    9108D41CFAD11             :REM*118
108 DATA D0092080D11D0AD16D029*E
    F8D16D0A0052C44CF70*6C3051A
    D8D02C904D04D             :REM*5
109 DATA A5C5C940F047C928D01A*C
    E42CFD03E8C42CFAD23*CDC9F2F
    03418AD23CD69             :REM*248
110 DATA 088D23CDD029C92BD01A*C
    E43CFD0208C43CFAD23*CDC932F
    01638AD23CDE9             :REM*189
111 DATA 088D23CDD00BC915F01D*C
    917D0032F4CEA9008D*25CDAD2
    3CD8D12D0AD11             :REM*132
112 DATA D0297F8D11D04C31EAA9*9
    D8D1403A9CE8D1503A9*008D1AD
    08D44CFA9FF8D             :REM*228
113 DATA 0DDCAD11D029EF8D11D0*A
    D11D029DF0D40CF8D11*D0AD16D
    029EF0D41CF8D             :REM*77
114 DATA 16D04C31EAAD44CFC901*F
    00DAD8D02C905D0EFA5*C5C915D
    0E9A9008D3D0D0            :REM*114
115 DATA 8D44CFAD11D09108D11*D
    02026CD4C81EA488A48*9848A59
    1C97FD0032F4              :REM*178
116 DATA CE4C4CFE85932F4CE4C*A
    7F42F4CE4CEDF5A5BA*F007C90
    3F0032F4CE4C              :REM*14
117 DATA 4AF3A9008D3D0D08D44CF*A
    D16D029EF0D41CF8D16*D0AD11D
    029DF0D40CF09             :REM*252
118 DATA 108D11D0A9298D1403A9*C
    F8D1503A9008D1AD0A9*FF8D0DD
    C60AD8D02C905             :REM*8
119 DATA D009A5C5C917D0032026*C
    D4C31EA9CCDCDCD0000*05050
                              :REM*111
120 DATA -1                   :REM*233
```


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THE RAMBOard

Beyond Super

RAMBOard does just what the other copy card on the market does: it adds RAM to your 1541 disk drive. This RAM is used to create a workspace where custom software can work its magic. Copy protection is evolving past the point of nibblers and other software-only solutions. Believe us, card based copiers are the future of archival technology.

So how do you decide between our card and "Brand X"? Don't compare the similarities - compare the differences. Their card is just "out there". You buy it, and that's pretty much it. RAMBOard was designed from the very beginning as an integral component in Maverick ™, a complete system of archival tools and products. Their card puts the burden of the work on you. Are you good at soldering? You better be - their card REQUIRES it. On the other hand RAMBOards require NO soldering to install, the only exception being a handful of older 1541C's. That's not all - the other guys say they don't use parameters, but what they really mean is they don't WRITE parameters. The user is required to make special critical "copy adjustments" to copy software. Sounds like creating parameters to us. On the other hand, RAMBOard uses Maverick parameters, designed by experts to instantly and easily copy today's toughest titles. So when the other guys say that their card will copy "everything", that may be true - providing that you can figure out the proper "copy adjustment" settings for everything. Good luck!

The differences go beyond the product itself. Software Support International is the company that began with the award winning Kracker Jax series of archival parameters. Our customer support system has earned industry praise, and we've established a reputation for honesty and integrity. A close look at the track record of the other guys will show just how deep our differences run. So when you're ready to get involved with the future of archival technology, pick RAMBOard - a product you can trust, from a company you can trust.

The RAMBOard

1541/1541C Version: $34.95

NEW **1541 II Version: $44.95**

1571 Version: $49.95

ATTN. C-128D Owners — The 1571 RAMBOard is for external drives only.

The RAMBOard is an optional Maverick accessory

THE 1750 CLONE

Are You Overdrawn At The Memory Bank?

Ah, the venerable Commodore 64/128. Stock, it has better sound than an Atari ST. Better graphics than a CGA equipped IBM. And more memory than....

Uh-oh.

As powerful as the Commodore is, memory has always been its weak spot. Some brilliant programmers have found some ingenious ways to work within the computer's very limited available RAM, but the fact remains that you can only go so far with 64 or even 128K. But you can go MUCH further with 512K.

The bad news is that Commodore's own 1750 512K RAM Expansion Unit (REU) is expensive and almost impossible to find. The good news is, we did something about it.

We bought brand new Commodore 1764 REU's, which come with only 256K of RAM. Next, we installed a 256K upgrade which was custom engineered to our demanding specifications. Once modified, we tested each and every unit and warranted them to be free from defects. The final product is called the 1750 Clone, and it's all the room you'll ever need on a simple plug in cartridge.

Once on board, you'll have a whopping 512K of RAM - the SAME amount of memory found on the Amiga 500. Your Commodore will operate at advanced levels of performance that the original designers never even dreamed of! You'll be amazed at the enhanced capabilities of software that takes advantage of the 1750 Clone, programs like GEOS, PaperClip III, and our own Maverick, to name a few.

The 1750 Clone works EXACTLY like the original 1750. It will open the door on years of extended use from your Commodore as even newer, more powerful software appears on the horizon, software that requires the room the 1750 Clone can provide.

Twin Cities 128 magazine says they "can completely recommend the 1750 Clone." Once you see it work, you'll feel the same way. So don't buy a whole new computer just to get more memory. Get the 1750 Clone instead -and get another decade of satisfaction from your Commodore.

IMPORTANT NOTES - READ CAREFULLY

C-64/64c (but NOT C128/128D) owners MUST buy a heavy-duty power supply to use these units. The power supply is NOT included - it is available from us separately. If you ALREADY own a 1764 RAM cartridge, we can upgrade it for you. Your unit MUST be in perfect working order for us to upgrade it. The turnaround time on upgrades is approx. 2 weeks. It will NOT be necessary for you to purchase a new power supply - the one that came with your 1764 will still work fine.

THE 1750 CLONE ONLY $199.95

1764 UPGRADE ONLY $124.95

ALL NEW

FasTrac/128 by Mike J. Henry

Look Who's Come Out Of The Basement

ALL NEW

At Software Support International, we've gained a reputation for providing Commodore owners with the products they need to get the most out of their computers. We've never hesitated to do whatever it took to provide you with the best software on the market. So when we decided to produce the ultimate 128 utility system, we went looking for one of the ultimate programmers.

We found him.

Mike J. Henry, the brilliant young programmer who was the driving force behind the "Basement Boys", the software team that created the phenomenal Fast Hack 'Em, has turned his considerable talents onto the 128. The result: FasTrac 128, the TOTAL utility system for your 128.

Here's a list of the major features found in FasTrac 128. ALL use both 40 and 80 column outputs and are PAL compatible for our overseas users. Read carefully -FasTrac 128 does some truly amazing things:

- **FasTrac/128 Disk Copy:** Single or dual drive · Copy with or without verify · Copy in 1541, 1581, or true 1571 formats · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's additional memory.
- **FasTrac/128 File Copy:** Single or dual drive · File Copy between ANY two Commodore compatable Drives including the SFD-1001, MSD drives, hard drives, and others · Copy in 1541 or true 1571 formats · 1581 file copy with partition support · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's additional memory.
- **FasTrac/128 M/L Monitor:** Go ANYwhere in memory · Access both main banks · Full scrolling in both directions · Includes scrolling DriveMon.
- **FasTrac/128 Directory Editor:** Edit and organize ANY standard directory · Edit 1541 or true 1571 formats · Edit 1581 directories with full partition support.
- **FasTrac/128 IBM ™/MFM Disk Copier:** Copy standard IBM formatted 360K 5.25" disks with your 1571 drive (required) · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's extra memory to copy in fewer passes.
- **FasTrac/128 1581 Duplicator:** Single or dual drive · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's additional memory · This is the fastest 1581 to 1581 copier ever created!

Quite a package, eh? We don't want to mislead you - FasTrac 128 is NOT for copying protected software. Our own Maverick ™ already has those bases more than covered. FasTrac 128 was designed to allow serious 128 users to get total control of their computers. If you want to own the finest set of utilities ever made for the Commodore 128, we've just made it a lot easier - we've told you the name . . .

Mike J. Henry's FasTrac/128

Only $34.95

ATTN. REGISTERED Maverick Owners ONLY: You may buy ONE (1) copy of FasTrac/128 for only $20.00
This offer is ONLY for orders placed with Software Support.

ALL NEW

THE 1581 TOOLKIT V2

If You've Been Waiting For A Sign, This Is It.

ALL NEW

Introducing the 1581 Toolkit Version 2, the newest incarnation of the best program you can buy for your 1581 disk drive. How good is it? Well, V1 received 4 1/2 of a possible 5 stars from INFO™ magazine - and V2 is even better. What can it do for you? Picture using your 1581 with a:

- ★ **Fast Disk Copier**
- ★ **Fast File Copier**
- ★ **Byte Pattern Search**
- ★ **Partition Creator**
- ★ **Ultrafast Formatter**
- ★ **Track & Sector Editor**
- ★ **Directory Editor**
- ★ **Error Scanner**
- ★ **Relocatable Fast Loader**
- ★ **File Track & Sector Tracer**

And V2 adds many new or enhanced features, like the fact that both our single drive fast data copier and fast file copier now support the 1764/1750 RAM expansion units for super-fast one pass copies, or like our 64k video RAM support for 128 owners! And remember also that all of our 1581 Toolkit utilities use hyperfast read/write routines and, wherever appropriate, allow full access to partitions.

So whether you're thinking about buying a 1581 drive or you already own a 1581 drive, we guarantee you'll never really USE a 1581 drive until you've got your hands on the 1581 Toolkit.

NEW LOW PRICE:

THE 1581 TOOLKIT (3.5 disk) . . . . . NOW ONLY $24.95!

VERSION 1 OWNERS: Upgrade to V2 by Sending us your Original Toolkit V1 disk along with $9.95 plus S/H

Ever wish you knew more about your 1581? David Martin's book, "The 1581 DOS Reference Guide", is what you've been wishing for. Martin's invaluable resource holds over 100 pages of detailed information that took over a year of solid research to compile. This exhaustive manual will show you the inner workings of the 1581 as nothing else can. Order now, and we'll include some additional utilities like a machine language monitor with DriveMon - the perfect companion to The 1581 DOS Reference Guide!

THE 1581 DOS REFERENCE GUIDE / $14.95

SPECIAL OFFER: GET BOTH THE 1581 REFERENCE GUIDE AND THE 1581 TOOLKIT FOR ONLY $34.95

C-128 VIDEO RAM UPGRADES

For 128 Owners Who Refuse To Be Left Behind

When Commodore first released the new 128D, we got one, opened it up, and took a good look. It didn't take long to discover one MAJOR difference. The standard C-128 has just 16K of video RAM, while the newer 128D has 64K. 400% more!

We knew that there were tremendous advantages to the extra RAM. Like being able to scroll through video memory or the potential for greatly enhanced color resolution. And, since Commodore had seen fit to make it a standard feature on all new 128D's, we knew it was only a matter of time before new software started taking advantage of the full 64K.

That time has arrived. Programs like BASIC 8, the BASIC 8 Toolkit, Spectrum 128, Sketchpad 128, and News Maker 128 have all been coded to utilize the full 64K of video RAM found on the 128D's. So if you've got a regular C-128 with only 16K of video RAM, you've got a problem. And we've got the solution.

You could upgrade on your own - but if thoughts of splattered solder and heat-damaged motherboards bother you, relax: we've developed a module that just plugs right in to your C- 128. No soldering, no hassles. Now your computer can have the same 64K video RAM as the new machines. And you'll be ready for whatever the future holds.

PLUG-IN 64K VIDEO RAM UPGRADE FOR C-128's

ONLY $49.95

Includes easy installation instructions

NEW LOW PRICE

KRACKER JAX VOLUMES 1-7

We Just Made A Good Thing Better - Without Lifting A Finger.

Kracker Jax, our ground breaking series of copy parameters, was always a superior product. When we made it, we made it right. So how can we improve it now? Easy. We slashed the price!

Each Volume of Kracker Jax allows you to make Unprotected versions of around 100 specific popular titles. No special knowledge or tools are required. Each Volume originally sold for $19.95. So if you wanted all 7 Volumes, it would have cost you $139.65. But now, you can buy each Volume for only $9.95 or, for you bargain hunters, you can buy **ALL 7 VOLUMES FOR ONLY $29.95!** That works out to a cost of only **$4.28** each!

We've also cut the price on The Shotgun II, one of the most powerful nibblers ever produced. Originally $14.95, you can now own it for only **$9.95!**

And just because there's a remote chance that it might be your birthday, we'll go one step further: Buy the Kracker Jax Volume 1 -7 package for **$29.95,** and we'll throw in The Shotgun II nibbler **FREE!** Quite a deal, huh? But if you want it, better hurry - supplies are limited. After all, nothing good lasts forever.

SOFTWARE SUPPORT INTERNATIONAL

Circle 17 on Reader Service card.

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DEALERS — WE HAVE THE SUPPORT YOU'RE LOOKING FOR!

GOLD MINE

Here are this month's gaming nuggets from fellow readers all around the world.

By LOUIS F. SANDER

AIRBORNE RANGER: If a high-ranking ranger dies on a difficult mission, you'll be directed to insert your Ranger Disk. Take out your original, turn off your computer, then reboot the program. Your ranger will be the same rank he was at the start of the previous game.

—JEFF OWENS
F. E. WARREN AFB, WY

ARKANOID: To get free capsules, press the space bar to pause the game, then type "dsi magic" (no quotes) and press the space bar again. Now type these letters for the capsules: E to enlarge the pad; P to get an extra life; L to get more firepower; B to get wavy lines (enter them to advance to the next scene); F to advance to the final stage; D to get three balls; and C to make the ball stick to your pad until you click the mouse.

—LUCY S. TERRIER
ALTON, IL

BATMAN: To play this game, you need certain items at certain places to progress. Here are some of the more important items, and what they do.

While fighting the Penguin: False Nose lets you walk around for a while without being recognized; Lock Pick lets you into the factory by the roof; Door Key lets you enter doors in the office factory; Lift Key lets you use the elevator; Rope lets you climb up to a secret office (use it in the room with the hole in the ceiling); Dart gives you a door pass when you throw it at the dart board; Door Pass admits you to the Penguin's house; and Tools fix the computer.

When fighting the Joker: Light Bulb illuminates the dark room; Gas Mask lets you breathe while walking in the sewers; Flashlight lets you see while in the sewers; False Teeth let you eat the Fish, the Coconut and the Coke; Wire Cutters defuse all the bombs in the sewers; and Money lets you play the slot machine to get the Joker card.

—JOE QUINN
APO, NY

BATTLETECH: Save your game right before the eighth training mission.

Select a Chameleon for the 'Mech to use. As soon as you start out, run (and I do mean run) southeast, using jumpjets over rough ground when needed. You'll see why shortly. When you get to the south wall, look for the hole, run south through it, then run west alongside the wall. You'll evade the Jenners and keep the Chameleon.

Don't let any of your good 'Mechs get hit in the back, because the armor back there is very thin. When it's pierced, the 'Mechs' gyros, engines, heat sinks and all the other sensitive stuff get fried. You can never replace gyros, engines or sensors. You can get another 'Mech, but only a Wasp, Locust, Stinger or Spider. Chameleons and Commando 'Mechs are one of a kind.

—JESSE MACNISH
TUCSON, AZ

DOUBLE DRAGON: On the second level, you can get by the first group of thugs by ignoring them.

To get past the second group of thugs, get on top of the beams and wait for the two guys to come at you. When they do, go back to the starting point of the current level, then return. You will be allowed to pass.

When you use a weapon against the enemy, keep your button depressed. Instead of swinging once, your weapon will swing twice.

—CHRIS BARRANTES
HADLEY, NY

F-14 TOMCAT: When you get a mission requiring you to fire only when fired upon, get a Sidewinder lock on the enemy group leader. (You may have to try several before getting the right one.) Ask him to leave when he gets a lock on you. If he drops his lock immediately, you're home free! Otherwise, the enemy will fire at you at point-blank range. The only way to avoid disaster here is to climb at full afterburner, or if you're at 60,000 feet to dive like a submarine. This will break the enemy's lock on you. When that happens, you can continue to evade them while asking them (politely) to leave.

—HARRO PENK
WAPPINGERS FALLS, NY

FAST BREAK: The most effective way to move the ball upcourt is by passing instead of dribbling. As soon as one of your players grabs a defensive rebound, have him pass the ball to a teammate, even if the latter appears to be well covered.

More often than not, this quick pass strategy will lead to a fast break and an easy basket for your team at the other end of the court.

—JAMES BRIGLEY
WORCESTER, MA

THE GAMES: SUMMER EDITION: Here's how to win at the Velodrome: Start out fast and get the lead. Let your opponent cross behind you, but don't let him pass. When you get to the last curve, speed for the finish.

—DENNY VERHOFF
OTTAWA, OH

GRAND PRIX CIRCUIT: On level one, your car can't be destroyed. So rather than slow down on the hairpins, turn into the grass at the 50-yard mark. With practice, you should end up on the pavement, still moving at 100 mph+.

—JASON SMITH
AVON PARK, FL

HEAVY METAL: In the tank scenario, incoming fire makes two different sounds: a shrill whistle and a low roar. The roar is from the rockets that come from the rocket launchers. These are your deadliest enemies, and should be eliminated as quickly as possible.

I've found it impossible to escape when that low roar comes in, but I've also found a way out of trouble. When the roar comes, hit the run-stop key to ►

ALL NEW

MAVERICK ™ V4

PLEASE Don't Call Us The Best Copy Utility On The Market!

We've always been known as the best Commodore copy utility made. But that label just doesn't fit us anymore. Because Maverick is so much more than just a copy utility. Over its life span, Maverick has evolved into a total software management system capable of extending the abilities of your Commodore computer well beyond its original capacity.

Maverick V4 continues the evolutionary process that is transforming our original copy program into a series of dedicated modules, each component created by a master programmer, each designed to deal with a specialized task. The result is a program that creates an entire software management environment of which backing up protected software is only one part. Software Support, the company that has always pushed the Commodore further that it was ever designed to go, is proud to present Maverick V4. We've added several important new features and many dramatic enhancements to the Maverick platform. For example:

- RAMBOard™ NYBBLER: A MAJOR leap forward in protected backup capabilities, our exclusive new nybbler works with our own RAMBOard to AUTOMATICALLY shred some of the toughest protection schemes ever created! This combination of ingenious hardware and superb new software can handle many protection schemes that are untouchable with conventional nybblers alone.
- RAMBOard GCR TRACK EDITOR: This new feature, found ONLY in Maverick V4, works with RAMBOard to allow you to read, write, and even edit whole tracks at a time!
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exit the tank, then re-select that unit. You'll start over from where you left off!

You can use the same trick when you have lots of one type of tank shell but none of another. When you exit and return, the computer will average out your ammo among all three types of shells.

—Zach Meston
Lahaina, HI

Hillsfar: When riding the horse at its fastest speed, you'll usually be able to jump any obstacle. A rumor in Hillsfar says that birds are scared of fast horses. So far, no birds have come my way.

When you get directions at your guild, read and remember them carefully. They won't be repeated.

If you're searching after you've broken into a building, you can get a message that the exit can now be found. This also means that the guards are searching for you. You can stun the guards and slow them down by walking over a little white object.

—Stephen S. Guy
Sterling, VA

Impossible Mission II: When you're on a lift at the bottom of the screen, always push down on your joystick to see if it will take you to another room.

Don't hesitate to use your Snoozebombs unless you haven't yet gotten the music for the tower.

There are certain rooms where it seems impossible to get to another level. Sometimes blowing up a robot makes it easier to get where you'd like to go.

—Brian Metcalf
Sandy Hook, CT

Jordan vs. Bird: To get high scores in the three-pointer contest, you must time how long you hold the button. Press it, then let it go just as your opponent brings the ball up into shooting position. You can get a score of 30 by doing this, although I always seem to miss one or two!

The easiest dunks to get high scores on are Statue of Liberty, Windmill, and Dr. J. Jam.

—Adam Wilson
Hollis, NY

Last Ninja 2: To get out of Central Park, you must first climb the fence, which is after the juggler. While you're up there, get the pole. Now get the hamburger and search in both ladies' restrooms.

Go into the gate, use the key, jump the boat, go north and jump onto the island. There you must take the pole and push the boat. Now go back to the bee screen and go west. When the boat floats across, jump on, then off to the street.

To get the sword in the street, kick the door that flashes. Kill the enemy and the sword is yours.

To kill the alligator in the sewers, light the bottle on the torch. Throw it at the big reptile, and you get roast 'gator!

To get past the dog in the basement, get the chicken and dip it in garbage. When it turns green, give it to the dog. Now put the credit card in the slot and go to the office.

Use the sword in most attacks. Other than the star, it is your most powerful weapon.

—Ernie Deakyne
Upper Montclair, NJ

Monopoly: When you're playing against the computer, here's a way to get property cheaper than the retail price. It might also work against human beings.

The secret is to keep track of the amount of money the computer has. When you land on a property that is too expensive for the computer, press No, indicating that you don't want to buy the property. That will start an auction for the property, and the computer will never bid more money than it has at the moment.

If you bid a little more money than the computer has, you'll be able to buy the property. It works.

—April Hieb
Fargo, ND

Out Run: If you're going at full speed, and you encounter three cars blocking all three lanes, try passing them on the side of the road. If there's nothing com-

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ing, it's just as effective as passing on the pavement!

—Geoff Holland
Norris City, IL

Red Storm Rising: When a torpedo is homing on you, increase speed to over 20 knots and make a hard turn. Left is usually best.

If you're being chased by more than one torpedo, try to release a noise-maker and make a turn around it. It's also useful to change your depth. If you are deep, go above the thermal layer. If shallow, go below the thermal layer and continue the turn. You can also release a decoy while in the turn.

When you're going after subs, try to get the first one with a torpedo before attacking the others. You can then use Sealance torpedoes on the remaining subs. It will keep them busy, and the Sealance has a very good chance of making a kill. Increase your speed when using active sonar, since the other subs will fire torpedoes at you.

As soon as you damage a warship with a missile, go after the other ships. When they're sunk, finish off the damaged ship with a torpedo.

—Robert L. Willsey
Martha, OK

Rocket Ranger: Remember that one fuel base is located in the jungle, and the other is located in the desert. Have an agent search in South America (where there is jungle) and another search in countries with deserts.

When you find a base, organize resistance in that country. The resistance will raid the base and begin sending you loads of Lunarium.

—Alejandro Diaz
San Jose, Costa Rica

Stealth Mission: If you want more air opposition, let out your landing gear and land at an enemy base. Believe me, that will shock them into launching their planes.

Do this if you can't get a lock on the enemy because of your position: Switch to Map mode and zoom above 16×. If the target doesn't appear, you're still not close enough. When the red target sign does appear, press L if your sight is in the rectangle. Fire your missile when ready. When flying the ancient ruins, it is easier to track targets in the ravine if you're in Map mode.

—Andre Straker-Payne
St. Michael, Barbados

Where in the U.S.A. Is Carmen Sandiego?: You can save valuable time by writing down four or five clues about your suspect before you use the Crime Computer.

Before investigating further, always read the information given about the state you are in. It reveals many important clues that can't be found anywhere else.

By the way, you must solve a total of 36 cases before you can capture Carmen and get yourself into the Acme Hall of Fame.

—Debbie Godfrey
Address unknown

Zak McKracken: When you run out of oxygen on Mars, run to your spacevan and say "use oxygen valve." In a few seconds, you'll have an hour's supply of oxygen.

To unite the two halves of the yellow crystal, go to the Stone Henge in London and take the earth girl with you. Place the flagpole (gotten from Nepal prison) in the altar. Give the scroll (gotten from Lima) to the girl. Place the two halves of the yellow crystal on the altar and have the girl read the scroll. Boom! Watch out!

—Marc Skinner
Quito, Ecuador ■

To submit your own C-64 or C-128 game tips for consideration, send them to Gold Mine, PO Box 101011, Pittsburgh, PA 15237. RUN *will pay $5 per submission upon publication.*

Submit all your tips on standard 8½-by-11 sheets of paper. Type or write legibly, and be sure to include your full name and address on each sheet.

Use separate sheets for each game, and combine all tips for one game on the same sheet. At the top of the sheet, clearly indicate the game your tip(s) apply to and the type of machine you run it on.

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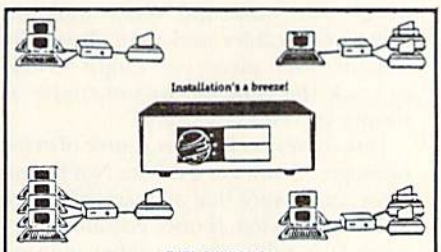

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COMMODORE CLINIC

Creating hi-res 64 screens and troubleshooting your Commodore system.

By ELLEN RULE

Q *How do I make high-resolution screens on my C-64? For games and various other purposes, I want to be able to create and control sprites with a joystick.*

—ADAM HAIN
TRES PINOS, CA

Q *I've been trying to write a program that uses a joystick to move a sprite around the screen, but haven't had very much success. Could you tell me how to do this?*

—GARY STOVALL
TEXARKANA, TX

A In order to read the joystick, use PEEK(56320) for port 2 and PEEK(56321) for port 1. The values you get correspond as follows: 1=up; 2=down; 4=left; 5=up and left; 6=down and left; 8=right; 9=up and right; 10=down and right.

The Commodore 64 Users Guide, which comes bundled with your new C-64, and *The Commodore 64 Programmer's Reference Guide*, both published by Commodore Business Machines, are two excellent sources of information for graphics and sprite programming on the 64. The latter, in particular, has an entire section devoted to graphics, including the various screen modes, and sample programs that demonstrate sprite movement and collision detection. In the book's Input/Output Guide section, there are Basic and machine language routines for reading joystick input. By combining and expanding on the sample code, you should have no problems writing the programs you're asking about.

I've also found that author Stan Krute's *Commodore 64/128 Graphics and Sound Programming* (published by TAB Books) contains a great deal of helpful instruction on sprite, character and bit-mapped graphics.

In addition, two articles in *RUN*'s 1989 Special Programming Issue—"C-64 Sprite Basic" and "C-128 Sprite Action"—may be of assistance. And, there are programs in the public domain (available from Commodore telecommunications services and user's group libraries) that you may find useful when designing and creating sprites.

Q *My C-128 works fine for approximately 45 minutes; then the screen freezes and the computer doesn't respond to input. After being turned off for an hour or so, the computer works fine for another 45 minutes. Any idea on what might cause this and how to fix it?*

—CARL J SPEHR
GAHANNA, OH

A It's difficult to diagnose without hands-on contact, but it sounds as if you're having a problem with heat build-up, either in your power supply or in the 128 itself. You may be able to avoid repair expenses by doing some basic troubleshooting of your own.

First, borrow a 128 power supply from a working system and try running your computer with it to see if the problem can be isolated to a faulty power supply. If the lock-up still occurs, then it's time for your 128 to visit a Commodore-authorized repair center.

Other malfunctions can be investigated by the same method of swapping components. For example, if you're not getting sound from a program that produces sound on another computer, first check the obvious—the monitor's volume control knob. Next try your computer with someone else's monitor, using your cables and then theirs. By isolating each piece, you might be able to track the problem to something as simple as a defective cable.

Disk drives are another source of error messages. If you get a Device Not Found error, make sure that all your cables are tightly connected. (I once encountered a 5-pin DIN cable whose rubber housing wouldn't allow it to be inserted far enough into my C-128 to make the proper connection.) Keep the cables behind your system neat by using cable ties or masking tape; cables that are tangled and crossed are subject to magnetic interference from one another.

Repositioning your components may also resolve interference problems. If a disk-access problem seems related to only a few disks, try disconnecting peripherals—like dongles, modems, fast-load cartridges and printer interfaces—that aren't required by the programs.

Q *I own both a 1541 and a 1541-II disk drive. Each one works perfectly when the other is off, but if I try to use one when both are on, I get error messages. I've tried every possible way of connecting the cables, but I haven't found the right combination. How do I hook up and use the two disk drives to my advantage? I'd like to have both working together for use with my Fleet System word processing software and to copy backup disks.*

—JIM CADY
DENTON, TX

A The Commodore 64 and 128 computers use device numbers to indicate where information is to be called from or written to; only one device of each number may be attached and turned on at a time. For example, the Commodore Datassette is device 1, and the modem is 2. The screen of your monitor or television is device 3, while your printer may be device 4 or 5. The disk drive can be device 8, 9, 10 or 11. In your case, I would take advantage of the DIP switches Commodore built into the back of the 1571, 1581 and 1541-II disk drives, which will let you set your 1541-II as device 9 and leave the 1541 as device 8.

The original 1541 drives are set to device 8 unless a solder bridge on the main circuit board is modified. Only a qualified technician should "operate" on the hardware this way, so most people change a device 8 drive to device 9 with this routine: Every time you start up, turn on the second device 8 drive and change it to 9 by loading and running:

```
10 OPEN 15,8,15
20 PRINT#15,"M-W" CHR$(119)
   CHR$(0) CHR$(2) CHR$(9+32)
   CHR$(9+64)
```

Then turn on the other drive (#8). In order to take full advantage of

both drives, your software must be able to "see" more than one drive. For word processing or other applications, use drive 8 for your program disk and drive 9 to store data on formatted disks. Because each program varies, check your software's manual for information about how to use the second drive as a data drive.

A file-copy program like RUN Copy (see "Friendly File Copier," *RUN*, November 1989) lets you transfer files from one disk to another, while RUN Shell (in RUN Works and RUN's Super Starter Pak) eases file maintenance and disk archival chores.

Q *Is there any software available for the C-128 that takes a program written in Basic and converts it to machine language?*
—DON BROUILLETTE
VILLE PLATTE, LA

A The most common way to produce machine language code is by programming in assembly language and using an assembler program to compile the machine language code. In this operation, there is "source code," the programmer's commented assembly language code, and "object code," the compiled machine language program. Machine language programs tend to run very fast because they're in the computer's native language.

Basic, on the other hand, is an interpreted language, which means that the Basic interpreter built into your C-64 or C-128 reads each instruction, figures out what it means and then executes it—every time the line of code is encountered in a program. This is quite slow in comparison to machine language.

A Basic compiler, such as Abacus's Basic Compiler for the 64 or 128, converts your Basic code to machine code or, optionally, to its own "pseudo-code." Kira Corporation's Gnome Speed for the 128 performs similar magic by converting your Basic code to "P-code," which is its version of pseudo-code. When you use a Basic compiler, each line of the Basic program is interpreted only once—when the code is compiled (or translated) into the machine language that the computer understands. Your Basic program is roughly equivalent to source code, and the compiled Basic is analogous to machine language object code. The conversion can enhance execution by making it up to 30 times faster. ■

RUN's contributing editor, Ellen Rule, is our Commodore Clinic guru. In her spare time, she is employed as an R.N., lends her expertise to user's groups and runs a business endeavor, Home Computer Resource.

Do you have a problem or question about your Commodore computer system, software or programming? Just send your questions to Commodore Clinic, RUN Magazine, 80 Elm St., Peterborough, NH 03458. Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

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128 Mode

Just in the nick of time, here's a useful program to keep your sprites in order.

By MARK JORDAN

ONE OF THE GLORIES of the C-128 is its amazing family of sprite commands—all except the Bump command, that is. Nobody should envy this function, which promises much but delivers little. It's supposed to tell you which sprites are colliding with which, but it reports the information as a number that must be interpreted to be comprehensible.

Even worse, Bump is so slow that one sprite may well move into and *through* another without Bump registering a collision. And if two sprites just nick each other, Bump couldn't care less.

This is such a problem that I finally decided to write my own version of Bump, one that would catch all the nibs, nicks and foul tips. NICK (Newly Invented Collision Kit) is the happy result.

NICK to the Rescue

NICK reports the numbers of the first three sprites that are colliding at any given instant. It does this by means of machine language, which you must install and call if you want to use NICK for your own programming.

Type in Listing 1, using *RUN*'s Checksum program to detect any typing errors, then save it to disk and run it once to get an idea of NICK's power. It will show you eight careening sprites and report on the lowest three (in priority) colliding at any instant.

To install NICK in your own programs, include line 10 and lines 60000 on up in your code. These lines install two machine language routines, one of them an interrupt (at 2816).

To use NICK, you first must start the interrupt, and the SYS 2816 at the end of line 10 does that. Then, anytime in your program that you might have used Bump—that is, anytime you want to know what sprites are colliding—just type SYS 2877: RREG A,X,Y. SYS 2877 jumps into a machine language routine, then RREG A,X,Y returns from it with the numbers of the three lowest-numbered sprites that are colliding held in variables A, X and Y.

For example, if all eight sprites were colliding, A, X and Y would hold 1, 2 and 3. However, if only the odd-numbered sprites were colliding, A, X and Y would hold 1, 3 and 5.

NICK isn't perfect. Due to the very nature of the interrupt-driven sprite commands, it's often a pixel (or even two) late in recording collisions. Also, it reports only the first three collisions. But, compared to the way Bump operates, these shortcomings are nuisances at worst.

To my mind, Bump is the runt of the Basic 7.0 litter. My instincts tell me to destroy the little guy, but I'm an old softy, I guess. I'll just give him a NICK, instead. So should you. R

Mark Jordan is a teacher of English in high school. He has been programming on Commodores for six years or so.

Running Instructions: **Type in Listing 1; then save it to disk and run it.**

Listing 1. NICK program. (Available on ReRun disk. See card at page 36.)

```
1 REM LINE 1Ø MUST BE AT THE TO
  P OF YOUR PROGRAM      :REM*21Ø
3 REM SYS 2877,Ø,Ø,Ø TO READ SP
  RITE-SPRITE COLLISIONS:REM*74
4 REM SYS 2877,Ø,1,Ø TO READ SP
  RITE-BACKGROUND COLLISIONS
                         :REM*112
5 REM AFTER SYS USE RREG A,X,Y
  TO FIND FIRST 3 COLLIDING SPR
  ITES.{2 SPACEs}SEE LINE 11Ø
                         :REM*169
6 :                      :REM*64
1Ø FORT=ØTO114:READA$:POKE2816+
  T,DEC(A$):NEXT:SYS 2816
                         :REM*88
2Ø :                     :REM*78
3Ø REM DEMO PROGRAM BELOW
                        :REM*147
4Ø COLORØ,12:GRAPHIC1,1 :REM*13
5Ø CHAR,Ø,Ø,"{3 SPACEs}",1:CHAR
  ,Ø,1,"{3 SPACEs}",1:CHAR,Ø,2
  ,"{3 SPACEs}",1        :REM*1Ø
6Ø FORT=1TO8:CHAR,Ø,1,STR$(T),1
  :SSHAPE A$,Ø,2,23,22:SPRSAV
  A$,T:NEXT              :REM*58
7Ø FORT=1TO8:SPRITET,1,T:MOVSPR
  T,T*4Ø,15Ø:MOVSPRT,T*75#2:NE
  XT                     :REM*181
8Ø GRAPHICØ,1:COLORØ,12:COLOR4,
  12                     :REM*52
9Ø :                     :REM*148
1ØØ DO                   :REM*78
11Ø SYS2877,Ø,Ø,Ø:RREG A,X,Y
                         :REM*94
12Ø IFA THEN CHAR,17,12,STR$(A)
  +STR$(X)+STR$(Y)       :REM*243
13Ø LOOP                 :REM*111
14Ø :                    :REM*198
6ØØØØ DATA 78,A9,ØD,8D,14,Ø3,A9
  ,ØB                    :REM*93
6ØØ1Ø DATA 8D,15,Ø3,58,6Ø,AD,19
  ,DØ                    :REM*4
6ØØ2Ø DATA 29,Ø4,FØ,26,AD,1A,DØ
  ,29                    :REM*251
6ØØ3Ø DATA Ø4,FØ,17,AD,1A,DØ,29
  ,FB                    :REM*42
6ØØ4Ø DATA 8D,1A,DØ,AD,1E,DØ,8D
  ,FØ                    :REM*167
6ØØ5Ø DATA ØB,AD,1F,DØ,8D,F1,ØB
  ,4C                    :REM*3
6ØØ6Ø DATA 33,FF,AD,1A,DØ,Ø9,Ø4
  ,8D                    :REM*84
6ØØ7Ø DATA 1A,DØ,4C,65,FA,BD,FØ
  ,ØB                    :REM*2Ø7
6ØØ8Ø DATA A2,Ø1,AØ,ØØ,8C,F2,ØB
  ,8C                    :REM*135
6ØØ9Ø DATA F3,ØB,8C,F4,ØB,18,4A
  ,9Ø                    :REM*234
6Ø1ØØ DATA ØB,48,8A,99,F2,ØB,68
  ,C8                    :REM*18
6Ø11Ø DATA CØ,Ø3,FØ,Ø5,E8,EØ,Ø9
  ,DØ                    :REM*141
6Ø12Ø DATA EC,A9,ØØ,8D,FØ,ØB,8D
  ,F1                    :REM*4Ø
6Ø13Ø DATA ØB,AD,F2,ØB,AE,F3,ØB
  ,AC                    :REM*1Ø5
6Ø14Ø DATA F4,ØB,6Ø       :REM*163
```

■

RUN it right: **C-128**

RUN's Checksum & Program Typing Hints

TYPE IN *RUN*'S CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running it. When typing in a program from *RUN*, first load and run *RUN*'s latest version of the Checksum program, which contains a new feature explained below. The screen will display a SYS number (49152 for the C-64; 3328 for the C-128) that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

When you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line as you typed it is correct. If the number that appears doesn't match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the appropriate SYS number, and save the finished program.

We sometimes get letters and phone calls from new readers who have typed in the Checksum program for the first time. They are confused by the "Out of Data Error in Line 30" message that appears when they try to run the Checksum program. Understandably, they compare line 30 of the listing with line 30 as they typed it in, and cannot find anything wrong. The message unintentionally misleads them into thinking the error is in line 30, whereas the typing mistake is actually somewhere in one of the Data statements in lines 190–350.

So, we've added a new feature to the Checksum program that alerts readers to the number of the Data statement line in the Checksum program where an error has actually been made. **Note that this feature works *only* on the Checksum program itself, and not on any other program listing in *RUN*.**

After you've entered and saved the Checksum program to disk, run it. If you've made any errors in any of the Data statements, the program will give you a specific line number. Find the mistake, correct it, press return, save the program and run it again. Repeat this procedure until the Checksum program runs flawlessly.

Control Characters Demystified

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key once. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACES}—press the space bar 22 times.

{SHIFT CLR}—hold down the shift key and press the clr-home key once.

{2 CRSR DNs}—press the cursor-down key twice.

{CTRL 1}—hold down the control key and press the 1 key.

{COMD T}—hold down the Commodore logo key and press the T key.

{5 LB.s}—press the British pound key (£, *not* #) five times.

Refer to the following paragraphs for any other Error messages you get from running any program listing in *RUN*.

Other Error Messages

Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these.

- You get an "Out of Data in Line xxx" message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the program line that reads the data, usually a For-Next loop. Make sure you have the proper values for the loop, because if, for example, the listing has a loop of 0 to 150, and you've typed 0 to 160, you'll get the Out of Data message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. It's more likely that you've skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing. Using *RUN*'s Checksum program when you type in listings from the magazine should help in this case.

- You get an "Illegal Quantity Error in Line xxx" message. This means you've read a number from a Data statement and tried to poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. First look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a "Syntax Error in Line xxx" message. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an "Error in Data" message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully. Correct the mistake(s), save the new version and try again.
- Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which will help you avoid every mistake we've mentioned above, except that it won't detect the omission of a line. Ⓡ

Listing. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
1Ø REM RUN'S CHECKSUM 64/128 - BOB KODADEK
2Ø MO=128:SA=3328:IF PEEK(4Ø96Ø)THEN MO=64:SA=49152
3Ø I=Ø:CK=Ø:CH=Ø:LN=19Ø
4Ø FOR K=Ø TO 16
5Ø FOR J=1 TO 1Ø:READ B:IF B>255 THEN GOTO 17Ø
6Ø CH=CH+B:POKE SA+I,B:I=I+1:NEXT
7Ø READ LC
8Ø IF LC<>CH THEN GOTO 17Ø
9Ø CH=Ø:LN=LN+1Ø
1ØØ NEXT K
11Ø POKESA+11Ø,24Ø:POKESA+111,38:POKESA+14Ø,234
12Ø PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
13Ø PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128 THEN 1
    6Ø
14Ø POKESA+13,124:POKESA+15,165:POKESA+25,124:POKESA+2
    6,165
15Ø POKESA+39,2Ø:POKESA+41,21:POKESA+123,2Ø5:POKESA+12
    4,189
16Ø POKESA+4,INT(SA/256):SYS SA:NEW
17Ø PRINT"YOU HAVE A DATA ERROR IN LINE ";LN;"!":END
18Ø REM DO NOT CHANGE THESE DATA STATEMENTS!
19Ø DATA 12Ø,162,24,16Ø,13,173,4,3,2Ø1,24,884
2ØØ DATA 2Ø8,4,162,13,16Ø,67,142,4,3,14Ø,9Ø3
21Ø DATA 5,3,88,96,32,13,67,152,72,169,697
22Ø DATA Ø,141,Ø,255,133,176,133,18Ø,166,22,12Ø6
23Ø DATA 164,23,134,167,132,168,17Ø,189,Ø,2,1149
24Ø DATA 24Ø,58,2Ø1,48,144,7,2Ø1,58,176,3,1136
25Ø DATA 232,2Ø8,24Ø,189,Ø,2,24Ø,42,2Ø1,32,1386
26Ø DATA 2Ø8,4,164,18Ø,24Ø,31,2Ø1,34,2Ø8,6,1276
27Ø DATA 165,18Ø,73,1,133,18Ø,23Ø,176,164,176,1478
28Ø DATA 165,167,24,125,Ø,2,133,167,165,168,1116
29Ø DATA 1Ø5,Ø,133,168,136,2Ø8,239,232,2Ø8,2Ø9,1638
3ØØ DATA 169,42,32,21Ø,255,165,167,69,168,17Ø,1447
31Ø DATA 169,Ø,32,5Ø,142,169,32,32,21Ø,255,1Ø91
32Ø DATA 32,21Ø,255,169,13,32,21Ø,255,1Ø4,168,1448
33Ø DATA 96,1Ø4,17Ø,24,32,24Ø,255,1Ø4,168,96,1289
34Ø DATA 56,32,24Ø,255,138,72,152,72,24,162,12Ø3
35Ø DATA Ø,16Ø,Ø,32,24Ø,255,169,42,2Ø8,198,13Ø4
```

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GEOWATCH

Here's some geoNews and also geoAnswers to your specific geoQuestions.

By TIM WALSH

SINCE I LAST AUTHORED this column (July 1989), very few Commodore-compatible products and announcements have been forthcoming from Berkeley Softworks. A notable exception is BSW's promise of a 512K RAM expansion unit. With Commodore ceasing production of their 512K 1750 REU nearly a year ago, Berkeley's replacement will be most welcome, as it's a necessity for users of the C-64 and 128 versions of GEOS 2.0.

Other news: QuantumLink now offers everything from interesting geoPaint artwork to conversion programs to online GEOS-related courses. Anyone using GEOS application software for work or entertainment should seriously consider the benefits of a modem and membership in Q-Link.

GEO Q & A

My mail tells me that many of you are finding it increasingly difficult to obtain responses to all your geoQuestions. I'll do my part by providing answers here this month. In next month's geoWatch, you can look forward to a compilation of useful geoTips.

Q *Using a Commodore 1750 REU has reduced the execution times of all my GEOS applications. However, unless I've planned an extensive editing session, I don't bother copying the programs over to the REU—it's far too time-consuming. Is there a batch file copy utility that expedites the copying of GEOS files to the REU?*

—JIM PURCELL
MILWAUKEE, WI

A If you have a copy of GEOS 2.0 for the C-64 or C-128, you're in luck. A multi-file copy utility is as close as your Commodore key. After using the Configure 2.0 utility to configure your REU as device B or C, activate the source disk on the deskTop.

Next, hold down the Commodore key and position the pointer over each file to be copied; click once on each one. You can even flip pages forward and backward to find all the necessary files. After selecting the last file, click the pointer one more time, and a ghost icon with the words "Multi File" will replace the pointer.

Position this icon over the destination drive and press the mouse button once to drop all the files into that drive. When copying files to RAM and other drives, you'll find this process so fast and convenient that you'll wonder how you ever got along without it!

Q *I recently began working with GEOS 128, but I've yet to get it to print properly with my Epson FX-86e printer. I encounter no problems when printing with other programs.*

—MILT FITZWATER
APO, NEW YORK

Q *When using geoPaint 1.3, my Panasonic KX-P1080i printer (with Xetec Super Graphix interface) prints about two-thirds of the geoPaint image, starting at the left side, and cuts off approximately one-third of the right side. No error message ever appears to indicate anything amiss. What's wrong?*

—SHIBU KINATUKARA
YONKERS, NY

A Both of these printer woes are relatively easy to fix. I'll address Shibu's geoPaint problem, since it's described in specific detail, but the solution is also applicable to Milt's query. GeoPaint doesn't return an error message, because as far as the software is concerned, nothing is wrong with the printing. The problem lies with either your printer interface or printer driver, either of which can lock the printer into outputting 60 dpi (dots per inch) images that lack the rightmost one-third of the screen image.

First, make sure that your printer interface is *not* set to emulate any type of Commodore printer. As with any printer interface used with GEOS, it must be set to Transparent mode. With the Xetec Super Graphix, you can set it to Transparent mode by moving all the DIP switches to the "off" position.

Second, be certain that you're *not* using a Commodore-compatible printer driver from within GEOS. Most Panasonic printers—yours included, Shibu—work fine when you select any of the GEOS Epson printer drivers (with the exception of the Epson JX-80) from the Select Printer option found on the deskTop. With the printer interface in Transparent mode and an Epson printer driver installed, your partial printouts are destined to become a thing of the past.

Q *Is the Commodore 1581 3½-inch disk drive compatible with GEOS 64? Can disk commands, like formatting and validating, be issued to a 1581 from within GEOS? Will all GEOS software work from a 1581?*

—CHRIS JOHN RAMAGLIA, MD
SAN MIGUEL DE ALLENDE
MEXICO

A Let's clarify any confusion surrounding GEOS and the 1581 once and for all: GEOS 2.0 for the 64 and GEOS 2.0 for the 128 both work fine with the 1581. The 2.0 is the only version of GEOS that offers 100 percent 1581 compatibility. Earlier versions appeared before 1987, when the 1581 was first produced.

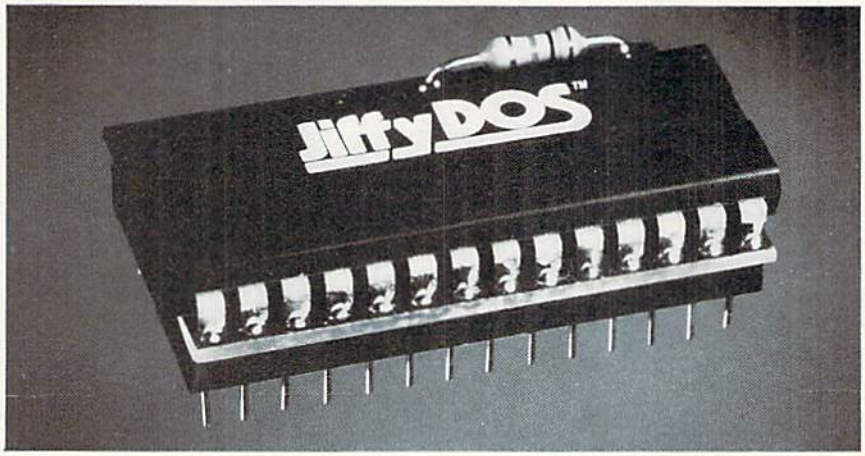
All disk commands work on the 1581, provided GEOS 2.0 is used. All GEOS applications, games and utilities also work fine from a 1581. In fact, GEOS 2.0 works so well with the 1581 that I use it as my primary 1581 file-copy utility.

Here's a little-known trick that I've used for making backups of non-GEOS files from 5¼-inch 1541/1571 format to 3½-inch 1581 format: Simply place a non-GEOS disk in the 1571 source drive and select "no" when asked to convert it to GEOS format. Then use the multi-file copy technique outlined in the answer to the first question above to quickly make backup copies of those files. ■

Tim Walsh, RUN's technical manager and Magic columnist, is also a GEOS enthusiast and our resident printer expert.

HARDWARE GALLERY

Boost your drive's speed even more dramatically with this upgraded version of JiffyDOS.



JIFFYDOS ..... A+

Speed and Versatility Are the Keynotes Of This Update

The weak link in Commodore 8-bit systems has always been the disk drives. They are slow, the 1541 brutally so. This inadequacy has resulted in the emergence of various means of increasing disk-access speed, the most popular of which has been a cartridge plugged into the computer's cartridge port. The arrival of the RAM expansion unit, however, made this a less than ideal solution. The two pieces of hardware could not easily co-exist; you usually had to remove one in order to use the other.

Enter Creative Micro Designs with an elegant solution called JiffyDOS. Rather than adding a plug-in cartridge to your system, you upgrade it by making chip replacements to both the Kernal ROM in your computer and the DOS ROM in your disk drive(s). This results in decreased load times while leaving the cartridge port open.

JiffyDOS requires that you open up both your computer and disk drive. This obviously voids any warranties that are in force, and hence is probably not an operation you want to make on new equipment. However, since there are fewer new C-64s and no new C-128s entering the market, this won't be a problem for most people much longer.

The instructions for making the chip replacements are clear, complete and easy to follow. One piece of advice—take your time. I ran into some problems, but they were my own fault, not that of the product. Before inserting the chip, make sure the pins line up with the holes in the socket, lest you end up, as I did, with a chip resembling a bowlegged caterpillar.

The replacement process is fast; two drives and a 128 took me less than 45 minutes. Once you've replaced the chips, the final step is to drill a hole in the side of your computer for a small toggle switch, permitting you to turn JiffyDOS off and on. Put the case back together, and you're in business.

Creative Micro Designs has released a sixth version of their product, with enhancements that include a two-drive file copier, a printer/screen output toggle, the ability to adjust the sector interleave, full support of an REU running under RAMDOS, programmable function keys in 64 mode, and automatic sensing of uppercase/graphics and lowercase print modes during screen dumps.

The DOS ROM and Kernal ROM chips supplied with JiffyDOS version 6.0 incorporate all of the latest upgrades from Commodore. They are also compatible with any other chip upgrades that you might have made to your system. For instance, over the years, my 128 has acquired a Basic 8 chip, as well as a 64K video chip. Both worked without a hitch after the JiffyDOS 6.0 installation. If you encounter a program that balks at the presence of JiffyDOS, simply flipping the toggle switch mentioned above reverts your setup to a stock system.

The first thing you'll notice with JiffyDOS is that it changes the function keys. Gone are the graphics, screen clear and monitor commands. In their place are definitions that let you scratch a file and list a Basic program or a text file from disk. The function keys work in both 64 and 128 modes.

The additional commands in JiffyDOS provide you with the power to redefine your default drive, dump a text screen to a printer, redirect all output from the screen to a printer, un-New a program, freeze a program listing and list a program one line at a time. There is also a command disabling the infamous 1541 head banging that occurs when disk errors are read.

As nice as all of this is, the main reason for purchasing JiffyDOS is to speed up ►

REPORT CARD

A Superb!
An exceptional product that outshines all others.

B Good.
One of the better products available in its category. A worthy addition to your hardware collection.

C Average.
Lives up to its billing. No major hassles, headaches or disappointments here.

D Poor.
This product has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

loading times. Does it? Yes, very much. While the effects of JiffyDOS 6.0 vary according to the drive, the mode in which you're using it and the individual program, there are any number of situations where the increased efficiency is nothing short of awesome.

The presence of JiffyDOS 6.0 is felt most profoundly when you're using a 1541 drive (or a 1571 in 1541 mode) with a C-64 or a 128 in 64 mode. When used in configurations other than these, JiffyDOS usually has some impact, although not as dramatic. In some situations, it has little or no effect—on a program such as GEOS, for example, which has a built-in, fast-load routine that bypasses the Kernal.

Even programs that don't seem to respond to the presence of JiffyDOS can sometimes get a performance boost. Ways to accomplish this can range from simply copying a file to a JiffyDOS formatted disk, to the more complicated task of adjusting the sector interleave on a 5¼-inch floppy (which has no effect on a 1581 drive). Simply put, the latter operation means adjusting the physical distance between blocks of a file to optimize access time. This entails a bit of experimentation, but the instructions to perform the task are quite clear.

The changes in JiffyDOS 6.0 have been made in the Kernal ROM, not the DOS ROM, so owners of earlier versions only have to change the chips in their computers, not their drives, to obtain the benefits of the latest edition. The cost for JiffyDOS owners to upgrade is $36.95 for the C-64 and $49.95 for the C-128. The package includes the Kernal ROM and one DOS ROM. There is also a trade-in policy: Return your old JiffyDOS Kernal, and the price drops to $19.95 and $29.95 for the 64 and 128, respectively. For first-time buyers, the prices are $59.95 for the 64 and $69.95 for the 128.

JiffyDOS version 6.0 does what it's supposed to, and does it well. No, it won't decrease the loading times for all programs, but in many of those cases nothing else will either. JiffyDOS coexists with all other equipment, doesn't affect copy protection schemes, offers a nice selection of extra commands and, best of all, leaves your cartridge port free. Add to this a company that provides excellent customer support, and you have a combination that's hard to beat. Now that I've used JiffyDOS, I'll never give it up. *(Creative Micro Designs, PO Box 789, Wilbraham, MA 01095.)*

—MICHAEL CAVANAUGH
LEVITTOWN, PA ■

Table 1. Sample load times.

C-128 in 128 mode	Stock 1571	Stock 1581	With JiffyDOS 1571	With JiffyDOS 1581
Pocket Filer 2	1:02 min	— —	1:02 min	— —
180-block data file	:49 sec	:32 sec	:30 sec	:26 sec
Fontmaster 128	:32 sec	:20 sec	:30 sec	:20 sec
BobsTerm Pro 128	:30 sec	:23 sec	:30 sec	:18 sec
Trinity (game)	2:51 min	— —	1:39 min	— —
Beyond Zork (game)	2:12 min	— —	1:38 min	— —

C-128 in 64 mode	Stock 1571 in 1541 mode	Stock 1581	1571 in 1541 mode with JiffyDOS	With JiffyDOS 1581
EasyScript	1:02 min	— —	:31 sec	— —
RUN Script 64	:48 sec	— —	:10 sec	— —
Multiterm 64	1:22 min	— —	:32 sec	— —
Xmobuf 7.4 (terminal program)	:51 sec	— —	:10 sec	— —
PHM Pegasus (game)	2:48 min	2:21 min	:33 sec	:32 sec
International Karate II (game)	2:25 min	1:56 min	:37 sec	:30 sec
Archon (game)	3:13 min	— —	1:15 min	— —

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Demystifying DOS	Ryan	Jan	50	
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Program Your Mouse and RAM Expander*	Brown, T.	Feb	54	C-64; C-128
The MS-DOS Connection*	Garamszeghy	Apr	30	C-128
The Multitasking Factor*	Butterfield	Apr	42	C-64; C-128
MS-DOS Disks to Order*	Garamszeghy	May	30	C-64; C-128
The MS-DOS/C-64 Connection*	Garamszeghy	Jun	37	C-64
RUN Shell*	Ryan	Jul	26	C-64; C-128
A Better Mousetrap*	Brown, T.	Jul	36	C-64; C-128
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Functional Keys*	Little	Oct	40	C-64
Friendly File Copier*	Parry	Nov	42	C-64
Get a Load of This!*	Miller	Dec	44	C-64

* Available on the bimonthly ReRUN disks, along with other programs from *RUN* and special bonus programs. To order, see the insert card at page 36.

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Crazy Caverns	Dec '88	48	Feb	71
Tag 'Em	Special Issue #5	66	Apr	72
Knock on Wood	Jan '89	12	Apr	72

Bonus programs that appear on 1989 ReRUN disks but were not published in *RUN* magazine

TITLE/DESCRIPTION	ReRUN ISSUE	COMPUTER
Multicolor Editor 64/Redefines the C-64 character set	Jan–Feb	C-64
Crabbie/Arcade game	Mar–Apr	C-128
Kidnapped!/Arcade game	Mar–Apr	C-64
Betweens/Strategy game	May–Jun	C-128
C-64 Animation Maker/See your own sprites in action	May–Jun	C-64
Storybook 64/Create computerized storybooks	Jul–Aug	C-64
Budget Plus/Keep track of your finances	Jul–Aug	C-128
The Battle/Strategy game	Sep–Oct	C-128
Customizer: A GEOS 120-dpi Printer Driver	Sep–Oct	C-64; GEOS 64
The Caroling Commodore/Christmas carols	Nov–Dec	C-128
Wraparound/Puzzle game	Nov–Dec	C-64
The Family Tree/Genealogy program	Nov–Dec	C-64

3 TECHNICAL PROGRAMS

Linear Programmer

Maximize: $Z = 2X_1 + X_2$

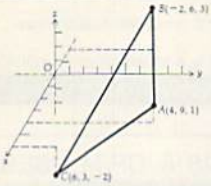
Subject to: $3X_1 + X_2 \leq 44$

$X_2 \leq 10$

$X_1 + X_2 \leq 18$

$2X_1 + 5X_2 \leq 60$

Solves linear programming problems of up to 50 variables and 35 constraints. Systems may be restricted by constraints of *equality, less than* or *greater than*, (different types may appear in the same problem). Objective (Z function) may be maximized or minimized. Computer displays solution (in example at left, Z = 31, X_1 = 13, X_2 = 5). Initial and final tableaus. Special command for easy entry of sparse contraints.



Analytical Geometry in 3 Dimensions

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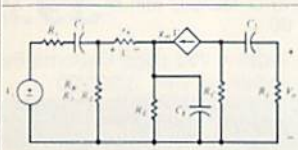
(NOT A GRAPHICS PROGRAM)



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RUN AMOK

Item: In line 1230 of the listing for "Wall $treet 128" (November 1989, p. 66), you must substitute the word REM for the words "BLOCKS FREE.", or the program will hang up at that point. Also, line 254 is too long, by one character, for the computer to accept. To make the line shorter, substitute a question mark for the first Print command in the line.

Item: In the last paragraph of the documentation for "Get a Load of This!" (December 1989, p. 44, and the November–December ReRUN booklet, p. 13), quotation marks were inadvertently omitted after the asterisk in the Load command. It should read ":*",8:.

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IN ADDITION... *RUN* will present reviews, computing and game-playing hints and tips, news and new products, answers to readers' questions and more.

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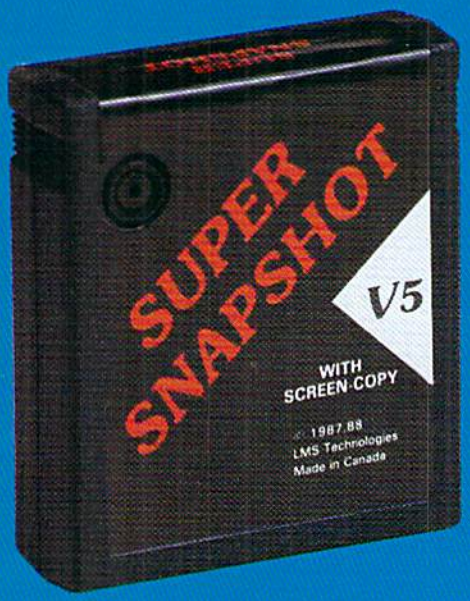

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